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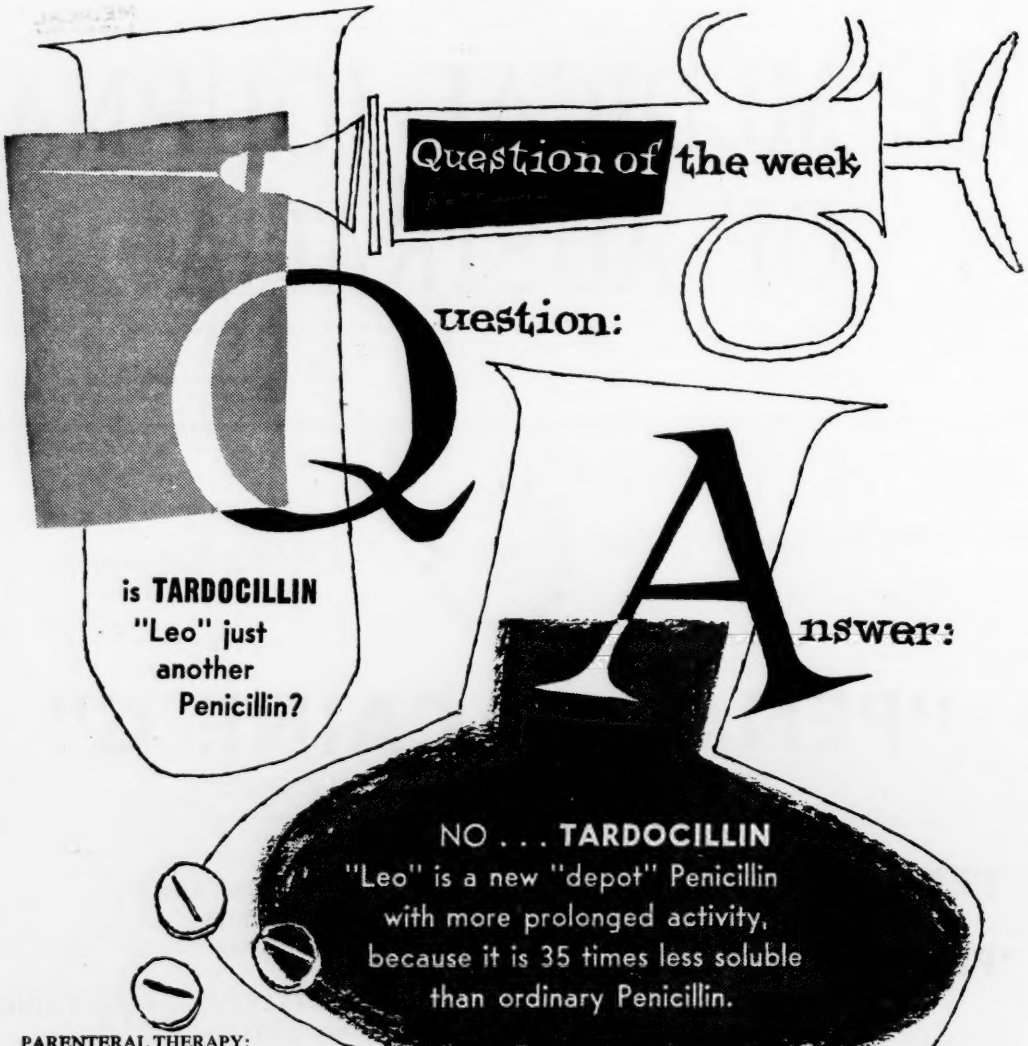
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Table of Contents.

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ORIGINAL ARTICLES— Page.

The Beattie-Smith Lectures—Lecture II: The Creative Activities in Mental Hospital Treatment, by E. Cunningham Dax 57

The Fenestration Operation for Otosclerotic Deafness, by Douglas G. Carruthers 64

Tracheotomy in Poliomyelitis, by J. A. Forbes .. 66

Deep X-Ray Therapy in Gynæcology, by E. J. B. Hardcastle 68

Meeting of Diseases, by Charles Engel 72

The Management of Epileptic Convulsions, by V. H. Webster, M.B., B.S. 76

REVIEWS—

Insanity, Art and Culture 78

Theory and Problems of Adolescent Development .. 78

Congenital Syphilis 78

The Foundations of Surgery 78

BOOKS RECEIVED 78

LEADING ARTICLES—

Evolution Today 79

CURRENT COMMENT—

Cortisone and Salicylates in Rheumatic Fever .. 80

Pulmonary Embolism or Thrombosis? 81

CURRENT COMMENT—Continued. Page.

Intestinal Perforation Complicating Malignant Lesions of the Colon 82

The History of St. Mary's Hospital Medical School 82

The Optimal Dose of Morphine 83

Neurological Complications of Rubella 83

Thefts of Drugs from Doctors' Motor-Cars 83

ABSTRACTS FROM MEDICAL LITERATURE—

Pædiatrics 84

Orthopædic Surgery 84

MEDICAL SOCIETIES—

Pædiatric Society of Victoria 86

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA 87

HONOURS 88

MEDICAL APPOINTMENTS 88

DEATHS 88

DIARY FOR THE MONTH 88

MEDICAL APPOINTMENTS: IMPORTANT NOTICE .. 88

EDITORIAL NOTICES 88

The Beattie-Smith Lectures.

(UNIVERSITY OF MELBOURNE.)

LECTURE II: THE CREATIVE ACTIVITIES IN MENTAL HOSPITAL TREATMENT.

By E. CUNNINGHAM DAX.

Chairman, Mental Hygiene Authority of Victoria.

IN my first lecture I discussed the need to reorganize the mental hospitals into therapeutic and dynamic communities. This is done by social therapy, which induces the patients to play their part in the group by shouldering their responsibilities, solving their own interpersonal problems and contributing to the development of the hospitals as "purpose organizations".

Psychiatric treatment may arrest the patients' disorders, enable them to overcome their personal problems, restore them to full occupation and reeducate them to fit in with their environment as active participants in a community life. But more than this is required; there appears to be the need for emotional release and for opportunities for sublimation, whether spiritual, artistic or creative.

[1] Delivered at Melbourne on September 22 and 29, 1954.

The scientific evidence that can be produced for such a statement is meagre. It is clear that frustration occurs when a goal cannot be attained because the person is thwarted or has too high a level of aspiration, and its degree depends upon the strength of the drive. It is subjectively evident that this frustration can be removed by discharge of the energy into different channels, and there seems to be no reason why the theory of sublimation should not be accepted on a comparable basis to the transmutation of energy in other fields. What is not clear is the origin of this emotional energy, or its mode of transmission into effective channels from the hypothalamus in both upward and downward directions. Creative activities of an artistic nature are confined to the human race, and they may be changed, impaired or extinguished by head injury or psychiatric disturbances. The skill of execution of the creative activities and perhaps the desire for their completion are cortical in origin; Freeman goes so far as to state that "creative artistry is impossible for a patient who has had a lobotomy", and he later relates this to the tip of the frontal lobes. This statement probably goes too far, though it is true that the same kind of creative artistry is rarely possible after such injuries.

The form of the creative activities will vary from one person to another, and the particular means by which relief is obtained will depend upon such factors as intelligence, temperament, motivation, education, aptitudes and type of thinking. It would appear that the greater the

person's ability for abstraction, the greater is likely to be his emotional release through an artistic medium. It is not, therefore, surprising that a type of concreteness occurs in paintings after head injury, which was shown by Schilder to be associated with a loss of conceptual thinking.

Obvious analogies are to be drawn between the recurring drive to a goal and the filling of an electrical condenser or the satisfaction of creative activity and the discharge of the apparatus. As yet there is not much evidence for such hypotheses, though high-voltage waves appear in the brain recordings from the electroencephalograph when a person is emotionally disturbed, and abnormal waves associated with an unpleasant experience settle down again when a pleasurable activity is resumed.

More can probably be learned of the need for creative activities from artists than others, for most of the writings on this subject have referred to them. If by examination of their impulses and their lives we are able to discover the effects of the creative activities upon normal people, we may be on more solid ground in encouraging the creative activities in the mentally ill.

It appears that creative activity is the end result of the need of the artist to express himself, and beforehand he often has a tense feeling and an urge to production. Many analogies to this tension preceding emotional discharge can be drawn from psychiatric practice — for example, the patient who grows increasingly frustrated and eventually has an hysterical outburst; this is spoken of quite freely amongst high-grade mental defectives as "creating". Again, relief is to be gained from emotional release by "abreacting", which is the bringing to the mind of some past unpleasant or traumatic episode; another such example is the mounting tension of some epileptics, for days or even longer, prior to the occurrence of a fit and its discharge with the convulsion. A comparison of a similar kind can be made with the person whose anxiety rises if he inhibits his compulsions or ruminations and is discharged if he follows his obsessional trends.

The artistic striving for creation, in reproduction or self-perpetuation, is universally recognized, and the sexual significance is obvious in many of the resulting products, as was shown by Kris in his studies on inspiration and creative processes. The pleasure of discharge is comparable in its significance, but can be obtained from many types of creation. For instance, it is said that when Newton discovered the solution of a problem his emotional joy was so intense that he was entirely incapable of proceeding with his work. In certain cases of epilepsy induced by flicker the discharge is orgasmal in nature, and Dr. E. Graeme Robertson recently described a number of such cases; Jean-Jacques Rousseau gave an account of his pleasurable experiences when he turned to the light when seeking inspiration. The fits which may be induced by music in susceptible people are not dissimilar and have been described as musicogenic epilepsy. One of the most striking examples is that of Berlioz, who was something of a grandiose romantic; he said that when he heard music he felt first a voluptuous ecstasy, immediately followed by general agitation with palpitations, oppression, sobbing, trembling, and termination with a fainting fit.

In some instances the creative disturbance is overwhelming, as in the anguish of Picasso, or in "the creative imperative" described by Klee "which the artist has no option but to obey". Or again, the tremendous creative drive of Michelangelo was described as the feeling that his figures were trying to break loose from their stone and that his function was to free them. Somewhat similar is Henry Moore's apparent striving to unite two figures into one in a relationship with Nature or mother earth. In many of his later figures he seems to have succeeded in bringing about the fusion he has attempted in both his sketches and his stringed sculptures through the use of the characteristics of the medium with which he worked.

On the other hand, the production of the creative activities may be passive or visionary; for example, music came to Mozart, he said, like dreams and not as the result of personal will or striving, and much surrealistic art makes use of this method of obtaining its material and inspiration.

People may create for magical reasons, and this was the basis of primitive art. It is also seen in the need to paint to capture the experiences that are enjoyed as if to fix them on paper or canvas, so that they belong to the artist. The same mechanism is used as a type of homœopathic magic to reject thoughts that are distasteful or are feared. Magic art can also be recognized in the artist's attempt to control or alter a situation on paper or in clay, if not in fact. This characteristic is frequently recognized in schizophrenic art, the difference being that the artist is aware of the significance of his act, the schizophrenic is not. The escape mechanism is somewhat similar, and it has to be considered whether modern art is not in many cases the flight from a war-ridden world which the artist can neither face nor influence. Regression to child-like artistic expression is common enough and was stressed by Matisse, whilst the fairy tale mechanism has been followed by Miro and Klee—though not without much adult sexual significance, as Graham Howe showed in his review of nursery rhymes.

The very interesting fairy gardens which abound in Victoria are profoundly creative, though their artistic achievements may be in doubt. The best known is the Old Curiosity Shop at Ballarat, though I know of nine others from Swan Hill to Cheltenham. They may well be studied in conjunction with nursery rhymes and children's stories and form a natural link between the reproductive and creative forms of art.

Modern art would often seem to be created in a sense of bewilderment, a striving for something which cannot be found and which is not understood, but with a tendency to organize the abstract by disciplining it into geometrical forms. There has been a search for symbolic representation through impressionism, cubism, surrealism, constructivism, to absolute or symphonic art. The resemblance to architecture, music and mathematics is not far removed, and the affinity with psycho-analytical thought is obvious. New ideas are incorporated, as in the changing form of "mobiles" and the conception of the shape of space. But one of the most interesting features is the way in which a new type of art is being evolved, which might be described as a symbol of a symbol. The modern creative product then becomes a sort of shorthand representation of the artistic creation as we have previously known it. In conventional art the result represented something which was recognizable, it expressed the artist's feelings about it with social appeal, as he desired to tell mankind what he himself felt. But in modern art he represents the thoughts he has on his own feelings, by condensed, fragmented, primitive and geometrical means, such as are frequently used in psychotic painting.

Already we have seen that many of the creative mechanisms are common to the artist, the psychoneurotic and the psychotic, and that the drives may be similar. Each may solve his problems, whether emotional or social, by these means. The distinction between abstract and psychotic art is equally difficult to make on the grounds of social appeal. Much psychotic art, such as that of Blake, has a present-day popularity, whilst that of Bosch is not only popular now but swept through Europe in the sixteenth century, whilst much incongruity in poetry and literature finds significance in its inaccessibility.

Creative activities are perhaps common to both psychotic artists and artistic psychotics, and in either case similar mechanisms of production are found to those in normal art. But in the normal there may be organization of the abstract, in the psychotic disorganization; nevertheless even this disorganization may not detract from the product's emotional appeal. It leaves us to think whether we can distinguish between psychotic and normal art as well as we can between psychotic and normal people, and even this is not always easy.

The subject of mental illness amongst the artists is one of interest, for by its study much should be learned about the effect of creative activities on psychiatric illness. It

also has to be considered whether the psychotic artists' productions have been the means of keeping them well. There are many examples of mental illness amongst the artists; for instance, Born, Brain, Hyslop and Nicholson have described them in a general way, and many others have produced individual studies. But the abnormalities of many artists have been strongly contested on the basis of association, for to suggest that someone with whom we share our thoughts and whom we can admire is of unsound mind is apt to reflect on our own sanity. For this reason the biographies and reviews are frequently deficient in the accounts of the mental abnormalities of the artists. Perhaps the amazing feature of the large numbers of ill artists, and particularly the musicians, has been their ability to create despite a very serious and lengthy mental disorder, and to remain free to follow their lives in the community. Blake, for instance, was hallucinated from an early age, had ideas of influence, was inspired by the dead, had grandiose thoughts and was at various times visited by Satan, Homer, Virgil, Milton, Dante and Moses. Schumann also had a long schizophrenic illness, but of a mixed type, as might have been expected from his build, with many serious bouts of depression in which he became suicidal, and in one of which he eventually killed himself. He described spirit voices as composing his melodies; it is unfortunate from the point of view of psychiatric studies that his wife corrected all his music.

Shelley was uncontrolled, impulsive, antisocial and severely hypochondriacal. He was a dreamer, sometimes hallucinated both visually and auditorily, and prone to states of ecstasy and dejection; yet practically all his work of any note was produced in the last years of his life, between the ages of twenty-six and thirty years, after he had had these symptoms for some years.

Manic-depressive illness is not uncommon amongst artists. Often their work has been done in the states of mild excitement and ceased in depression. Handel's variability of production and his conduct were characteristic, and others who suffered from psychoses were Clare, Cowper, Dickens, Strindberg, Newton and Rossini. Christopher Smart was peculiar, in that all the best work that remains was created in his depressive phases.

There were a number of other suicides or suicidal attempts, such as those of Hugo Wolf, Chatterton, MacDowell, Stravinsky, Van Gogh, reported as having occurred in bouts of depression, though none of these were true manic-depressives. Perhaps the most restrained of descriptions relates to Matthew Green, who wrote his best known work on the spleen and the relief of melancholy. It says: "Green terminated a quiet inoffensive life of celibacy in 1737 at the age of forty-one."

Elgar's history is of interest to those in the mental hospital field, for he played in and conducted the Powick Mental Hospital band. At that time he became very depressed and gave up music completely, and only after prolonged persuasion by the medical superintendent was he gradually induced to resume his studies.

Why, one wonders, did these and many more artists create so well? Did they create because they were of unsound mind? Was their artistic or creative drive too great, so that the frustration was responsible for their illness? Or were they sensitive, imaginative people with personality disorders in whom mental ill health more easily occurred? Perhaps the total number of artists is so large that psychiatric disorders are no more frequent than in the general population. Nicholson thinks that this is the case among writers, and Born can find comparatively few illustrations amongst the painters and sculptors; but certainly amongst the great musicians the case is different and the disorders are very frequent.

Weygandt noted that mental illness may (*a*) obliterate art, (*b*) not affect art, (*c*) facilitate a dormant talent, (*d*) cause a change of style.

The effects of illness on art are a fascinating study, and will still allow of much productive research into the relationship between the life histories of the artists and the form of their creative activities.

It seems, however, that no person can be given abilities through illness which he did not previously possess, even if the illness is the means of liberating his art; thus the disease in no way makes the artist. Of particular interest in this light are the "*peintres naïves*" or the "populistic painters", as Anastasi and Foley termed them, of which Henri (*douanier*) Rousseau is the best known. Their paintings show realism, rigidity, distortion, repetition, naïve symbolism, imagined surroundings and combination of the means of expression. These paintings are not unlike those described as characteristic of schizophrenics. Both Anastasi and Lafora have shown that a painter does not become a "*peintre naïve*" because of his illness, but if he paints in this way he is a "*peintre naïve*". It is notable that many of these painters, as for instance "Grandmother Moses" in the United States of America, began painting late in life. Their only knowledge was that of their youthful means of expression, so that in some way their products appear regressed and perhaps for this reason schizophrenic.

The creative spell described by Reitman after the operation of leucotomy has some bearing on this production of art in illness. Frequently it is found that in the early post-operative period a single creation is produced at a higher level than before. Freeman suggested that this was the expression of a residual pre-operative concept terminated by its discharge. But the post-operative product is no more than the highest level of the patient's capability, which appears only when his creative drive is relieved of its inhibitory mechanism.

It has been shown that without a history of previous production there is some difficulty in distinguishing the psychotic artist from the artistic psychotic. It is still harder in the psychotic artist to recognize the effect of illness on his art, and of his art on his illness. At either end of the scale it is simpler. Some artists have had their art obliterated by illness; Rossini for instance never wrote an opera again after composing "William Tell" at the age of thirty-seven years. In fact, he produced only two more major works, both religious, in the thirty-nine years that followed before his death, and nothing for ten years after his breakdown. At the other end there are such examples as those of Christopher Smart, who wrote his "David" whilst depressed, and Green, who produced his poem "Spleen" as the result of his illness. Midway there are artists such as those who have been mentioned previously, who have produced their finest work whilst they were mentally ill, and people who have been mentally ill who produced material of artistic merit only at that time. If only for this reason, materials for creative activities should be provided for the mentally ill in hospital. However, even if most patients are unable to produce material of true artistic merit, many can at least express their feelings very definitely in artistic media with much subjective relief, and in many cases with objective improvement.

Creative Activities in the Mental Hospital.

Nettl said: "The deeper the feelings the less will we find words to express them." He might have added "or the fewer the people we can tell them to". Both Naumberg and Field, for instance, have stressed the time saved by painting as a means of emotional release, and how it may curtail analytical time, as paintings can express feelings more quickly than words. Through condensation much can come out, like dream material, in a single brief episode, and with examination the patients gradually understand the significance of their symbolism by working through the disturbing material, so that they gain insight and relief from their symptoms.

Many may not be able to follow creative activities at an imaginative level, at least without organized means of expression. However, it is amazing how few failures of production there are in a group where the patients know that they are painting with a therapeutic end, and that whatever they produce will be of value to them.

As a hospital becomes highly developed, its facilities for treatment must expand. It is not difficult to provide

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the whole range of creative activities and to run them together. This means that opportunities for writing prose or poetry, painting, sculpture, modelling, ceramics, music, acting and puppetry, movement and design should be available, and I am going to consider a number of these briefly in turn to show how they can be run together in a hospital, and one in particular at a little greater length, as it has not been described before.

There is nothing very new in the use of any of the arts. Patients were producing their own music in Conolly's time at Hanwell, and the brass band was given a special article in *The Illustrated London News*. Lombroso wrote about painting in hospitals in 1870. In fact, as long as schizophrenics have been in hospital, so have they created in order to rechannel their world to their own wishes in creative media. I remember asking a nurse why no toilet paper was put out in her ward, and she told me that it was because her patients would draw on it.

In the organization of the various artistic activities, there are three objects to be considered and the means for their fulfilment which should be supplied in each case: first the instructional activities, secondly the production of emotional release by the process of empathy, and thirdly the opportunity for the patients themselves to create.

On the instructional side library books should be available, illustrations, scores and technical books; but Adrian Hill's story must not be forgotten. He had a tuberculous patient doing excellent work which suddenly faded off. He found on inquiry that this was the result of reading a book on "how to paint" which the patient had borrowed from the library. As a general interest lectures on the various arts are popular and a stimulus to production, or at least to a consciousness of values.

As examples in which empathy plays a major part, live concerts and gramophone records, picture exhibitions, prints, theatre and plays, sculpture, ballet, ceramics, all have their value.

Empathy is the projection of the self into an emotional situation, a way to obtain contiguity, and the pleasure of being a part of these forms of art, or losing one's identity in them. But this appreciation of art becomes a stimulus to creation and production by a desire to emulate the master and to express the feelings aroused by the æsthetic experience.

Most of the arts have a much longer history of use in mental illness than is generally realized and this is particularly the case in music, as Sidney Licht has pointed out in his book on "Music in Medicine".

Réja in 1908 described many forms of activity; but in nearly all cases these descriptions have been of casual examples collected by the authors, though more specific experiments have been carried out, such as those by Mohr on painting in 1906. The difference is that in recent years opportunities to create have been organized along the lines of group treatment and group social therapy, so group creative activities are arranged not only in choirs, folk dances, play-acting, and bands, but also, for instance, in drama, painting, murals, puppets and studio activities. These group organizations therefore supply the opportunity for the patients to gain the knowledge to express themselves, to appreciate the art of others and to be given the stimulus and facilities for creation for their own satisfaction.

In the mental hospital the creative activities will succeed only if the members of the staff are in general sympathy with the project, and if they understand the arts as a method of treatment. The activities are therefore prescribed by the doctor, not as a recreation or entertainment, but as a definite form of treatment.

All that was said about the teaching of the staff in the first lecture could well be repeated in this context.

In the literary activities the hospital journals and magazines are useful, particularly if serious material is encouraged. One of the most remarkable of books, which was republished after A. J. Symonds's "Quest for Corvo", is "The Desire and Pursuit of the Whole" by Rolfe (self-styled Baron Corvo), which must be the most complete and illuminating of all psychotic works. But even in the everyday patients' letters there is much good writing. An extract from one I recently received is as follows:

> Every movement brought an audible question or remark repeating or criticising my thoughts or actions and most were pointedly insulting. The condition lessened by singing and noisy clatter and I have studied the effects to find that type of articulate thought comes with heavy physical duress. This ground is backed by a dairy farm and the herd will sometimes graze quite close against the house and in heavy weather a foundation is created in the room.

I have thought that much of the best of the mental hospital poetry has been lost; compared with patients' other artistic activities it is not as frequently collected and often enough it may have disappeared in the mass of indecipherable papers which have to be sorted within the patients' mail. In my own experience the librarian never obtained much enthusiasm for a poetry society, though poetry readings were popular amongst a select few. Much of the schizophrenic poetry is as obscure as a "Hymn of Truth" in eight stanzas, of which the following is a part, but in many cases it has some real merit in its rhyme and sound:

> I find all consciousness of anything
> Experience, possession, thought or deed
> Outlined within and less than Mind; this seed
> Unfolds the verity of God and man
> Mind is the form of consciousness; the plan
> Of all reality takes form through me
> But I see not myself externally
> Thus man is more than I alone to wing.

There remains a very large field of experiment in the literary field to be investigated therapeutically and artistically, which will expand in any hospital with encouragement, particularly if taken in conjunction with a library service.

When painting is fully organized as a form of treatment amongst groups of patients it will, as I showed in "Experimental Studies on Psychiatric Art", achieve the following ends: (*a*) fill in the patient's time in hospital and supply a useful hobby; (*b*) provide emotional release and become an aid to diagnosis, treatment and prognosis; (*c*) give useful information as to the patient's progress during treatment; (*d*) be an adjunct to psychotherapy; (*e*) be of value in research.

One point which is useful to bear in mind has been learnt from the study of children's art, though it is not often stressed. Thus a person's feelings, or in this case his abnormality, can be measured by an assessment of the difference between the object which exists and that which is represented.

Painting is easily encouraged amongst mental hospital patients; the magical quality of being able to deal with situations on paper or canvas appeals to the schizophrenic patient in particular.

Recently I saw a chalk drawing on a yard of a mental hospital which was of quite an attractive type of house, Dutch in design, with an ornamental door and two floors. This, like those of many schizophrenics, was a skeleton or transparent picture, so that one could see from the outside what was going on within. The patient explained that the man inside was burning a fire to start the machinery which caused the ambergris from below to come up through a series of tubes to clean the floors for him to please the male nurse. In the same way the patient may capture his hallucinatory tormentors in the painting, and they will disturb him less by being controlled in this way.

A similar and interesting example of the same mechanism in modelling fell into my hands one evening, when a woman came to see me asking if the hospital was influencing her. She then produced a large number of coloured wax models from a bag, which she said were the people who had been shouting at her as they passed the bottom of her garden. I tried to induce her to give them to me, but their protective function was too strong and she would not part with them.

I regret that I have to confess to some petty pilfering.

To be able to create or understand sculpture necessitates a three-dimensional appreciation, which on mathematical grounds at least is a more advanced form of study than

that of drawing. But as a creative activity there seems to be a difference between carving and modelling. Carving is slow and more detailed, and necessitates greater discipline and a constant reduction in size; modelling, on the other hand, gives a more rapid satisfaction; it allows of elaboration and freer expression. In either case much more aggression can be liberated than in the other creative activities, and it is found that figures are more frequently produced than in painting or ceramics.

Ceramics suffer by the tension engendered and fear of loss through baking or breaking. Despite the crematorium-like experience of the figures, the glazing and colour seem to make them live, and some of the most vital patients' productions appear in this medium. One example demonstrates a woman's projection of her own lost eye and her tendency to torticollis onto the rabbit. Another of the problems associated with ceramics is the difficulty in acquiring sufficient technical skill for the patient to be satisfied with the production.

This, of course, is also one of the major difficulties with music. We all have an enormous amount of musical material at our disposal, which we have committed to memory and which can be used at will. Music is symbolic; but its meaning differs from one to another according to what people wish to read into it to satisfy their own requirements. Obscenity, for instance, may have some legal meaning in other types of art, though it is difficult enough to uphold; but to sustain a conviction for the production of indecent music would be almost impossible. However, for people to produce their own music by an instrument is apt to be frustrating, for the technique needed can seldom be acquired to a sufficient degree for persons to express themselves adequately. I believe the regulating action of music, well known for many centuries in China and in ancient Greece, may have much value when we understand more of its action on mood and movement. At present I think its greatest value may be in the mental deficiency colony, which could be widely organized on the basis of musical activity.

The theatre, puppetry and the dance are more widely used than before, and through psychodrama, by problem acting with figures constructed by the patients and by movement to music, considerable progress has been made in the treatment of the psycho-neurotics. These arts have found less application in the mental hospitals as yet than the other forms of creative activity, though these means of emotional release are being explored.

As my last example of the use of the creative activities in mental hospital treatment I should like to describe the production of free embroidery. Though it was mentioned by Réja in 1908, this activity has to my knowledge never been organized amongst mental hospital patients before this series was produced. When occupational materials were very short at the end of the war, we appealed for scraps of wool and obtained large amounts from many sources. These were given in bulk to the disturbed and regressed female patients and sorted into colours. Each patient then had a tray with many different types of coloured wool, quantities of canvas bought from damaged stock, and sacking. The patients were, in most cases, unemployed and had been unemployable and in many instances practically inaccessible. They were allowed complete freedom of choice of colour, size and design, and they worked without frames. About 300 such tapestries were produced, of which four are reproduced here.

For convenience it was found possible to classify the large majority of the embroideries into five main groups: those that told a story or were magic, the diagnostic, the utilitarian, the conventional designs, and the disintegrated products. The relative proportions are of little value, owing to the small numbers in each of the rough, overlapping groups, when so many factors had to be considered, such as the diagnoses, the ages, experience with this type of work, previous occupation, intelligence and other variables.

Some of the stories could be told by the patients; others seemed to have come from a train of thought they could not recall. The two magic tapestries are remarkable for the precision of the stitching. This is all the more amazing since the woman who produced them had many religious

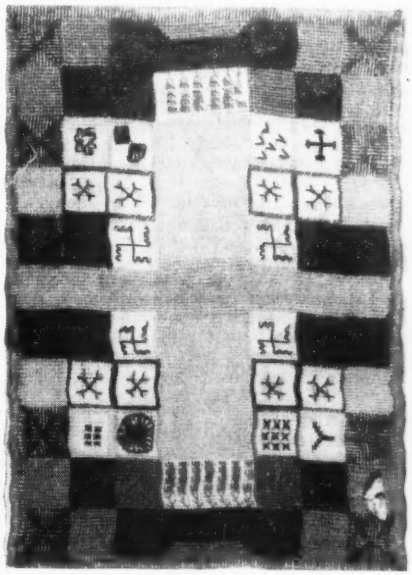

FIGURE I.

delusions and was extremely aggressive. In making these designs she talked to herself, dwelling particularly on some of the symbols; but she was not prepared to give a description of their meaning (Figure I). A very similar

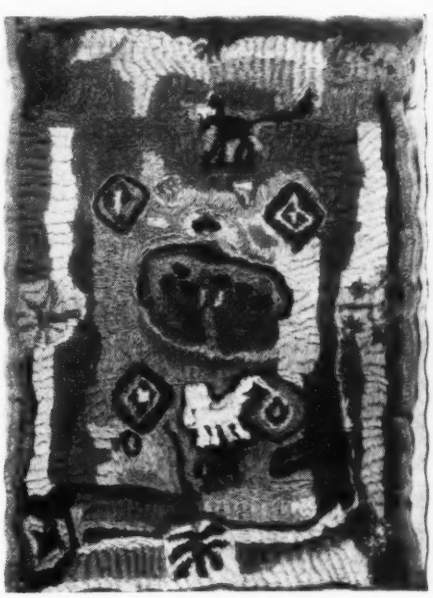

FIGURE II.

rug was constructed, in which no fewer than four different kinds of crosses were devised, each with some significance related to persecution and the Wars of the Roses. The

story of her possessions signed "Nicky" was one of a series concerned with her garden and her animals (Figure II). Above is the cat with the proboscis; below, the dog and its puppy; at the sides it seems that there are two stray dogs outside her garden. In one of her later pictures she gave the animal a bag full of coal to feed from, which she stitched onto the design to project, as do the tails, the ribbons and the snout of the cat.

The diagnostic group is well illustrated by a piece of embroidery from a schizophrenic whose paintings were very similar (Figure III). The fragmentation and failure to relate one portion to another are characteristic. Another example comes from a long-standing schizophrenic; it has extremely bright colours, which Robertson believes to be due to a weaker feeling in relation to colour. In schizophrenic painting "inappropriate colour choice" may have a different significance. A third example, with yellow, purple and blue squares seems to illustrate this sign; but I find that it is not agreed generally, and it may therefore be difficult to define the sign.

The utilitarian group embraces the numerous kettle holders, cushion covers, antimacassars, table centres and shopping bags that were produced, often unexpectedly by regressed patients.

Three conventional designs are very different: the first is a good ordinary design, the second seems to have a degree of artistic value, particularly when it is realized that it was entirely freehand. The third is the only specimen from a more recent patient. She was a lifelong neurotic, highly inventive, hysterical and hypomanic. Not long before producing this picture she had been depressed and was treated in hospital with electroplexy. It shows a remarkable competency of execution to give the depth and an oil-painting effect so that it can be appreciated only with distance.

FIGURE III.

Finally there is a completely disorganized tapestry from a deeply regressed patient, who had been well enough to use a typewriter in the office a year previously (Figure IV).

These tapestries are interesting in a number of ways—for instance, the variability of the design and means of execution. A large number of different stitches are employed, many complicated, and often the care taken is out of all proportion to the artistic or utilitarian value of the finished product. It is difficult to relate the types of stitch to the deterioration of the patient or to the value of the product, although in these examples the most deteriorated patient has produced technically the least skilled work. Most of these women were middle-aged and had all been ill and in hospital for a long time, with the one exception noted.

Perhaps the most remarkable feature was the patients' persistence in the work and the small amount that was left unfinished. Moreover, it seemed to have a soothing effect, and disturbed patients became quietly occupied at the time when they were working. Mostly they sewed for two hours a morning, some longer. Despite the length of time necessary for the completion of these squares, many of the same features appear as are seen in schizophrenic paintings — perseveration, inappropriate colour choice, fragmentation, disintegration, magic symbols, and the failure to differentiate between fantasy and fact. In comparison with painting, embroidery has little to recommend it, particularly as its use is not so general as it used to be. However, there may be two ways in which its study is of particular value—in the investigation first of the colour choice, and secondly of the type of design. Because of the slowness of execution, this may be worked out with much greater care than in pictures and may seem more permanent to the maker. It also has some value as a sedative form of occupation in some groups.

It seems clear that there are many means of artistic expression which can be made available to the patients, and that much is still to be learned of their relative values. The fact that they are so eagerly used and that they engage the attention of disturbed patients for long periods is of value, particularly if it is true that the schizophrenic uses his artistic products as a means of coming to terms with his environment. There is much evidence to show that artists with many psychotic features were able to continue to live in the community whilst they were still creating remarkable material. The dynamics of creative activity, apparent in the artists, also seem to give support to the value of creative activities in mental hospital treatment and to the need for their organization on a larger scale.

It appears that the various forms of artistic production are of much use for diagnosis, emotional release, treatment and research.

But there is another valuable function to be mentioned. It is necessary for the future welfare of the patients in the mental hospital services that the standards of living should be improved, and there can be no more satisfactory means of carrying this out than by raising the cultural level of the hospitals through the creative activities.

The New Hospital.

Throughout both these lectures you will have been aware of the difficulty of generalizing on the use of social therapy or the creative activities in the mental hospital as it now exists. This is in fact a difficulty not confined to these two, but affecting all the other forms of treatment as well as the administration, staffing, purchasing and supplies. The present mental hospital organization is in fact wasteful, purposeless and inefficient. I am proposing to conclude my lecture with a discussion as to how the mental hospitals might be reorganized to fit the requirements of modern treatment. I indicated in my first lecture that the mental defective patients ought to have the opportunity to be trained separately from the mentally ill, and this division has already been made in all the most modern mental health services.

Next there is much to be said for the separate treatment of the aged. A large number of those who have grown old in hospital have "burnt out" their psychoses and are not very different from the rest of old people with impairment of their faculties. The very fact that it is estimated that up to 20% of the total mental hospital population in America, England or Australia are fit for less specialized care and a different type of accommodation would make it wise to consider their problem separately. But in the first place let me examine the problem at an earlier stage. A geriatric service based on the out-patient care of the aged in their own homes is the only reasonable

way of avoiding mental and physical deterioration. No country can afford the wholesale admission to hospital of its aged folk, nor can it afford to allow them to become incontinent of urine and fæces and bed-ridden. If loneliness is avoided, if social workers, visiting doctors and nurses are employed, and if home helps, "meals on wheels" and "Darby and Joan" clubs are available for the aged, a very large proportion can be kept at home and remain well. These services cost very little compared to the in-patient care of the aged. Geriatric units should be available where old people in poor health can be taken, for instance in school holidays, or when the person keeping an eye on them is ill, and this will frequently enable the old person to live outside when otherwise he would need permanent hospitalization. The aged are much happier living in their own homes or homely little one-roomed flats than in the chromium-plated anachronisms or hospital blocks which are sometimes suggested for their care. With such a service many of the aged now admitted to mental hospitals would never become sufficiently demented to go further than a geriatric unit or the long-term annexe or institution which should be a part of the service for the aged needing care.

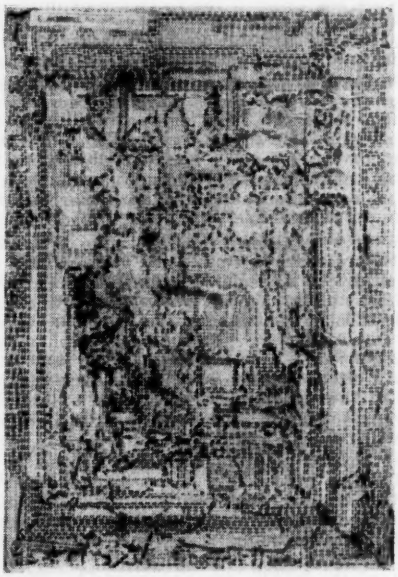

FIGURE IV.

However, as the average age of the population rises, there will be an increasing number of aged people needing psychiatric aid, as shown by the remarkable United States figures. The specialized treatment, occupations, supervision and diet of these people make it economically sound for a geriatric unit for the mentally ill to be established, whatever may be the outcome of the planning of the other geriatric services.

If the mentally defective and the elderly are separately treated, provision has still to be made for the mentally ill in three other groups.

The very large proportion of those who are likely to benefit by treatment can be rapidly ascertained, and they can well be kept in short-term hospitals—early treatment centres or psychiatric hospitals, as they are called in England, or receiving houses in Victoria. There are differences; but in any case the patient with a severe neurosis or psychosis who needs in-patient treatment in such a unit should have every benefit applicable to any modern hospital, as his prognosis has been shown to be every bit as good as patients with medical illnesses treated in the general hospitals. But such a hospital must be specially designed for the complete needs of social therapy and full creative activities on an intensive scale, as well as having full facilities for psychotherapy, occupational therapy and the physical methods of treatment. Such a unit should be near the populated area, so that the patients are enabled to return to their homes and a normal community life as a part of their treatment.

If a patient is going to be unable to return home, he should, with modern treatment, be able to lead a useful life in hospital. No State or country can afford to support one in every 250 of its numbers permanently in hospital without return. Over 30,000 mentally ill people in Australia constitute a very big labour force to carry as permanently unemployed and dependent. The hospital occupations as organized at present do not pretend in any way to be industrial units. I believe that a second type of unit, which I would not call a hospital but an "industrial centre", should be evolved, perhaps with a closed industry. The large majority of the mental hospital patients have been trades union members, and such a unit as this could be run in the closest possible cooperation with the trades union movement, which might well have the most active part in its management. The living conditions would be good enough for those who could not be rehabilitated to their normal community existence to be content to remain there. Payment could be made on a piece-work basis, with a realistic charge for board and keep, and the recreational, social and residential amenities should be such as would, at least, give a full community life within a sheltered environment.

How far such a scheme might develop is difficult to know; but with full employment combined with nursing care and medical attention immediately available for those showing signs of relapse, the casualties should be few and the successes many.

Thirdly, there are the patients who have regressed, or are so deluded, disturbed or antisocial that they are unable to enjoy the freedom and amenities or to follow the occupations that the industrial unit would give. These I would treat, not in a mental hospital, but in an occupational hospital. Its function would be to get its patients back to work by group methods, such as habit training, resocialization and the creative activities, and by conditioning them to a routine, in exercise, occupation and living. This is a "total push" method which is aided by intensive nursing, occupational and medical treatment. All activities would be carried out by the patients as a group, but with the modifications necessary for the regressed, disturbed, delusional and antisocial members, and it would probably be necessary to divide the hospital on this basis. This is not far removed from what happens now in some hospitals; but at the present time the intensive training is hindered by the need to care for the other types of more active patients. Such a hospital would be heavily staffed with nurses, and their status, at least as far as their remuneration is concerned, should probably be higher than in the other branches of the in-patient service. The achievement of making such patients into useful members of the community should be regarded as at least as important as any other kinds of social service.

To summarize, the first step is to split off the mental defectives and geriatric cases from the present mental hospital populations. The mental hospitals as such would then change, and the stigma could well be lessened by dividing them into psychiatric hospitals, industrial centres and occupational hospitals. The psychiatric hospitals would be largely designed for intensive medical treatment, with social and creative activities as a means of active rehabilitation.

The industrial centres would be mainly dependent on instructors, who might be supplied and controlled through trades union cooperation.

The third or occupational hospitals would have intensive nursing and occupation to supply the patients' needs towards group reorganization.

XUM

If future hospitals were built with these principles in mind, it would not be long before such a reorganization could take place, with a resultant gain in efficiency and purpose. The chief problem is often one of regionalization; but the psychiatric hospitals at least can easily enough be regionalized, so that patients with early mental illness can constantly be visited and can return to their own communities as a part of their rehabilitation.

Conclusion.

The mental hospitals have come to the cross-roads, forced there by the newer methods of treatment, and a bold reorganization is now needed. Only in this way can we treat our patients to enable them to live at peace with themselves, their family and their neighbours, engaged in useful occupation, and contributing to the cultural activities and the development of a mature country.

THE FENESTRATION OPERATION FOR OTOSCLEROTIC DEAFNESS.[1]

By DOUGLAS G. CARRUTHERS,
Sydney.

IT is twenty years since Sourdille in France and Holmgren in Sweden performed the first of an extensive series of operations for the relief of otosclerotic deafness, and it is about fifteen years since Lempert, of the United States of America, proffered modifications of technique which aimed at the one-stage creation of a fenestra likely to remain open and of lasting functional utility. Thousands of these operations have now been performed, and sufficient time has lapsed for it to be practicable to assess clearly the lasting value of the surgical approach and to compare the functional results with those obtained with the use of hearing aids.

It must be realized at the outset that in only a proportion of cases is deafness of the type for which operation is applicable. A large number of patients, especially amongst the elderly, are found to have a defective inner ear or nerve mechanism. No operation as yet devised has given any assistance to these patients. Likewise in most cases of congenital deafness, or of severe deafness in the very young, it is the perceptive mechanism which is at fault. Otosclerosis accounts for more than half the cases of acquired deafness of adolescent and early adult life. In a proportion of this age group inflammatory middle ear disease, too, may leave a cicatricial contracture or thickening, which by restricting the vibrations of the ossicles of the middle ear may in effect produce deafness clinically similar to that of otosclerosis. The essential cause of deafness in otosclerosis and in these cases of middle-ear fibrosis is that vibrations initiated by air-borne sound waves are prevented from reaching the cochlear fluid of the inner ear via the oval window. Some air-borne impulses may still be able to enter through the round window, but this apparently is not sufficient. It is necessary to have two openings, one at either end of the rigid bony cochlear tube, so that as one is pressed inwards, the other may move outwards and *vice versa*. The basic objective in operating, then, is to provide a new opening close to that which has become inoperative through bony or cicatricial changes. It would be better still could we operate actually upon the occluded oval window itself, but for anatomical reasons such a procedure has to date been impracticable. However, we can surely and safely now make an opening in the ampullary end of the external semicircular canal, which is but one millimetre removed from the oval window and opens into the same end of the cochlear tube as does the normal oval window. There is little doubt, too, that with the technique which has been developed this opening can be made sufficiently large to function effectively, and this can be expected to remain open in the great majority of cases. What, then, if any, are the shortcomings of the operative procedure, especially when viewed alongside the benefits able to be gained from the use of the highly efficient modern hearing aids?

Firstly, can either method be expected to provide fully normal hearing? It has been shown that the eardrum with its ossicular levers normally adds a force equivalent to 25 to 30 decibels of sound loudness to the wave impulse imposed at the oval window. The fenestration operation as at present performed cannot give back this portion of the wave impulse which normally would reach the inner ear. On the other hand, hearing aids have not only to compensate for the mechanism which in these cases is more or less inactive, but as well must first overcome the impedance of those normally mobile structures, which are now fixed at the oval window. There is no doubt that hearing aids can do this, but not always without producing distortion of the sound wave, and consequently of the resultant cochlear stimulus, so that clarity is not always completely perfect. The risks to life and such disasters as facial paralysis associated with the fenestration operation are, in the hands of the experienced operator, quite negligible. In some instances final healing is delayed with a variable discharge from the remaining raw areas. The application of split thickness skin grafts to the mastoid and meatal recess has lessened the incidence of this nuisance; but the problem is not yet completely overcome. The period of stay in hospital has been able to be greatly reduced with a better understanding of the process of healing, so that the patient is usually able to walk to the toilet after the third or fourth day, and can return home after eight to ten days. Infection is avoided by meticulous care at operation and at all dressings, and by the use of antibiotic "cover" for three or four days. Distressing vertigo and vomiting are very largely avoidable with correct posture and, when necessary, with labyrinthine sedatives such as "Andramine", "Avomine" *et cetera*.

To sum up, the fenestration operation is definitely a worth-while procedure in otosclerotic deafness, and in some cases of cicatricial ossicular fixation, in which functional tests indicate normal or near to normal cochlear responses. Age of itself is no contraindication provided the evidence points to an efficient inner ear and nerve mechanism. With later years, however, arterial insufficiency and other ills of the flesh often do cause some contracture of functional efficiency of these more vital structures, so that the proportion of suitable cases may not be so high in the later age groups.

Can the surgical technique be expected to be further improved? Yes, undoubtedly it can, and for this reason if for no other the operative approach must continue to be encouraged. There have been all manner of approaches to the fenestration site, some anteriorly through the external auditory canal, some from above through the roof (tegmen) of the middle ear and mastoid. The Lempert approach is through an ingenious incision around the external auditory meatus, and anteriorly from this upwards and forwards between the tragus and helix. In some instances the access gained by this approach is rather restricted. Simson-Hall, of Edinburgh, has adhered to the old mastoid incision. Amongst others, Rüedi, of Zurich, prefers the posterior approach. Undoubtedly in many cases a wider access is obtained through this incision. It cannot be gainsaid that freer access is likely to permit more frequently successful technical procedures in preparation of the fenestra and its subsequent covering. Skin grafting to hasten complete healing of the cavity has been a great advance in technique. Rüedi now prefers to carry out the operation in two stages, making the mastoido-atticotomy and placing the tympano-meatal flap over the prepared external semicircular canal first, and securing complete healing with a skin-grafted cavity. At a later operation after an interval of four months, the mastoid incision is again opened and the integumentary covering over the external semicircular canal is reflected forward to the margin of the tympanic membrane. In the bloodless field now available the labyrinthine fenestration is readily performed. Rüedi claims a great reduction in the incidence of low-grade inflammatory or trophic labyrinthine reactions

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on September 23, 1954, at Sydney Hospital.

with this method, and thus points to a means of avoiding those occasional baffling disappointments in which a severe or total loss of function may follow an operation which has seemed to be technically perfect. With the conquest of all risks from trauma, infection and biological shock, and with reasonable certainty of providing an adequate and permanent fenestra, our next great hope must be for a method which may provide for the same measure of efficient function as that devised by Nature, with the use of the middle-ear mechanism to concentrate the vibratory sound impulse into the oval window and inner ear. It is possible, too, that the ossicular chain is responsible for imposing the vibrating impulses upon the cochlear fluid in different phases of pressure from that acting through air alone upon the round window. These two functions of the middle ear make it desirable that operative procedures to restore hearing should aim to make further use of these structures. The preserved tympanic membrane and tympano-meatal flap fixed with some tension over the artificial fenestra undoubtedly do conserve this function in some degree; but we must aim to provide a less impeded mechanism than this. Such are the directions in which further success may be sought. There is no doubt that human ingenuity will devise methods which will further improve the gratifying results already obtainable.

The cases presented have been selected not only because they illustrate the alleviation which this operation can bring to many who are afflicted with deafness, but also because they form examples of the intriguing problems in otological research which experience with the fenestration operation has so often inspired. Any procedure which can do the things which fenestration has done has more than justified itself. There is no doubt that the operation can and often does produce a gain in hearing sufficient to remove all disability completely, and to enable a patient to associate equally with others in conversation, music and all walks of life. What can be done for the few gives inspiration to efforts aimed to bring similar relief to many more. Modern hearing aids can do just as much and are applicable most readily for the very patients who are suitable for fenestration. Why, then, should the operation, still with a few hazards, and not always able to be guaranteed, continue to be advised when a hearing aid might do as well? Probably the strongest argument for the operation lies in the fact that otosclerosis is a progressive ailment and this advance is not checked by the use of a hearing aid, whereas experience has shown that in most instances, when a fenestration successfully restores the hearing, the progress of the deafness in the operated ear is checked or stopped altogether.

CASE I.—A female patient, aged twenty-nine years, had otosclerotic deafness; the right ear was the worse affected. A right fenestration procedure was performed on January 12, 1950. The hearing gain of 15 to 20 decibels in the speech range was disappointing, but was quite a help to the patient. The pure tone audiogram for the right ear has remained as it was after operation six years ago. The hearing in the untreated left ear has progressively deteriorated. Early in 1954 the patient sought to have the left ear operated on. A relatively severe loss in the higher tones suggested possible cochlear deterioration, and operation was not very favourably considered. At the patient's request operation on the left ear was carried out on May 24. The results have been agreeably surprising. The gain in perception in the left ear has been only of 10 to 15 decibels in the speech tone range, but for some inexplicable reason there has been a remarkable "lift" in the right ear. The patient today has discarded her hearing aid and feels that she can again enjoy music and conversation.

This case illustrates the check in further progression of deafness in the treated ear, while that not treated became gradually much more severely deafened. A slight beneficial reaction in the opposite ear has been observed by others, but so far no clear explanation has been forthcoming.

The second great reason for continuing with fenestration operations is that many patients demand the operation in preference to wearing a hearing aid. Many have one ear operated on and later ask for a similar procedure on the other.

CASE II.—A male patient, aged forty-nine years, suffered from otosclerotic deafness, more severe in the right ear. A right fenestration procedure was performed on March 10, 1947, with about 30 decibels gain throughout the tone range. The gain has been maintained. At the patient's request the left ear also was operated on in January, 1950. A gain of 20 to 25 decibels has resulted on the left side. The patient is completely rehabilitated and has been able to carry on at responsible work requiring good hearing. The ears require occasional cleansing of wax and epithelial debris. His deafness has advanced no further in either ear since the operations.

CASE III.—A male patient, aged thirty-eight years, had suffered from deafness growing progressively worse since the age of twenty-four years. The right and left ears were about equally affected. Tinnitus was troublesome. The patient's father was hard of hearing.

On examination of the patient the ear drums appeared normal. The Eustachian tubes were patent. Bone conduction was better than air conduction (the Rinné test produced a negative response). Absolute bone conduction was normal. An audiogram revealed a hearing loss to air conduction of 50 to 70 decibels throughout the tone range. The bone conduction, however, was but little affected, although at 1024 cycles it was down to 30 decibels in the right ear and at 4096 cycles was turning further downwards to a 40 decibel loss. A diagnosis was made of otosclerotic deafness, reasonably suitable for fenestration, although not quite first class on account of the dropping bone conduction.

A right fenestration operation in one stage was performed on March 15, 1954, through a post-aural incision. After the tympano-meatal flap had been turned back and placed over the fenestra, the balance of the mastoido-atticotomy recess was lined with free split-thickness skin grafts held in place with alginate gauze packing. The posterior wound was securely sutured in two layers. All packings were removed after ten days. Healing was uneventful. The patient has gained an average of 40 decibels throughout the speech tonal range.

CASE IV.—A female patient had suffered from failing hearing in both ears for about twelve years. Her mother and one sister were deaf. Slight opacity of the right tympanic membrane was present, but the Eustachian tubes were freely patent. Bone conduction hearing was better than air conduction hearing. A diagnosis of otosclerotic deafness was made.

A right fenestration operation was performed in March, 1954, through a post-auricular incision. The operation was completed in one stage. A tympano-meatal membranous flap was turned back over the fenestra. The cavity was completely lined with free split-thickness skin grafts. Healing was uneventful. The patient had a gain of over 30 decibels throughout the important speech frequency range.

CASE V.—A female patient, aged forty-one years, had suffered from deafness for five or six years. The right ear was the worse. There was deafness in the mother's family; one brother and one sister were going deaf. The tympanic membranes appeared normal and the Eustachian tubes were patent. Absolute bone conduction was normal in all fork tests.

A fenestration operation was performed in two stages on the right ear. At the first operation, through a posterior incision the mastoid antrum and upper compartment of the middle ear (attic) were exposed. The incus and head of the malleus were next removed, so that the external semicircular canal was freely exposed. The external semicircular canal was further exposed by smoothing down cancellous bone about it. A flap of skin comprising the integument of the posterior wall of the external auditory canal was next cut and reflected so that it remained continuous with the postero-superior margin of the tympanic membrane. This flap was reflected backwards to overlie the exposed external semicircular canal. The remainder of the mastoido-attic recess was lined with split-thickness skin grafts, which were secured in place with alginate gauze packing. The posterior wound was finally closed accurately in two layers with catgut and silk sutures respectively. Healing was uneventful.

After an interval of four months the field was again exposed through the same retroauricular incision. The integumentary flap overlying the external semicircular canal was outlined with a sharp incision and reflected forward so that the prominent bony semicircular canal was exposed. The operation was carried out under the microscope, and a fenestra was made into the canal lumen, care being taken to avoid injury to the delicate membranous canal within. After careful toilet to remove all bone fragments, the

integumentary flap continuous with the tympanic membrane was replaced over the fenestra. The posterior wound was again carefully closed. Healing was uneventful. An average gain of 40 to 45 decibels throughout the speech tonal range resulted. The patient shows greatly improved perception of speech.

Professor L. Rüedi, of Zurich, is the principal exponent of the return to two-stage fenestration surgery. He argues that traumatic labyrinthitis is less likely to occur with this procedure, and that in practice his experience has confirmed that contention. A further advantage is that the surgeon approaches the most delicate part of the operation in the second stage, when he is fresh and thus better able to control precise and delicate actions.

Summary.

1. The operation of labyrinthine fenestration produces a considerable gain in hearing capacity in a high proportion of selected cases.

2. The good results obtained are maintained in the majority of instances.

3. The occasional occurrence of unexpected loss of hearing in the treated ear is a hazard not yet able to be fully explained. However, the other ear is not harmed.

4. A rather obstinate discharge from the ear, and the occasional recurrence of otorrhœa, are nuisances likely to be avoidable with modifications of technique.

5. Improved results with further modifications of procedure may be expected in the future.

6. The whole problem of the hearing process, and of deafness and methods for its alleviation, has been challenged more hopefully and enthusiastically as a result of the inspiration arising out of the development of the fenestration operation.

TRACHEOTOMY IN POLIOMYELITIS.[1]

By J. A. FORBES,
Fairfield Hospital, Melbourne.

POLIOMYELITIS is still a pædiatric problem, but in each succeeding epidemic year the proportion of adult patients has been increasing. In 1937 only 5% of 1275 poliomyelitis patients admitted to Fairfield Hospital were aged fifteen years or more, whereas in the year ending August 1, 1954, 32% of a total of 280 patients fell into this category.

Although it seems likely that the child population will continue to be more susceptible in the absence of poliomyelitis immunization, the increase in adult cases intensifies the problems of management for the following three main reasons: (i) a higher proportion of adults are paralysed, there being 59% of paralytic cases amongst children under the age of fifteen years, as against 82% amongst the adults admitted to hospital at the same time in 1953-1954; (ii) the paralyses are more severe; and (iii) cases of pharyngeal and respiratory involvement are more frequent and severe in those aged fifteen years or more than in children under the age of fifteen years. In 1937, when only 5% of the patients were aged fifteen years or over, 23% of paralysed patients had pharyngeal or respiratory involvement, whereas in 1953-1954, when 32% of the patients were adult, the number of cases of pharyngeal or respiratory paralysis had risen to 33% of paralytic cases. Moreover, in 1953-1954 the percentage of paralysed patients with pharyngeal or respiratory paralysis under the age of fifteen years was 24, as against 47% in the older age groups (Table I).

If the mortality rates in 1937 and in 1953-1954 are compared in cases of respiratory and pharyngeal paralysis, amongst which almost all the deaths due to poliomyelitis occur, it is apparent that the prognosis has improved, particularly for the older patients (Table II). Among patients aged fifteen years and over in this group, the mortality rate has fallen from 73% to 22%, whilst under the age of fifteen years deaths have been reduced from 22% to 10%. This improvement in prognosis is ascribed to the introduction of chemotherapy and to tracheotomy in selected cases.

Tracheotomy in poliomyelitis may be an epidemic problem as well as one related to the individual patient, as illustrated by its inevitable use as an adjunct to intratracheal positive pressure artificial respiration during the epidemic in Copenhagen in 1952, when the occurrence of 345 cases of pharyngeal or respiratory paralysis far exceeded the existing facilities for their management (Lassen, 1954). In view of the fact that Copenhagen has a population roughly equal to that of Melbourne, it is relevant to note here that the absence of facilities and the occurrence there of an explosive major epidemic of about 2300 cases are related, in that the relative dearth of cases in the previous years did not reflect an immune community but a highly susceptible one.

TABLE I.

Poliomyelitis: Patients Admitted to Fairfield Hospital from August 1, 1953, to August 1, 1954.

Age Group. (Years.)	Total Number of Patients.	Paralysed.	Pharyngeal or Respiratory Paralysis: Proportion of Paralysed Group.
Under 15	190	112 (58·9%)	27 (24·1%)
15 and over ..	90	74 (82·2%)	35 (47·4%)

As they had one tank and six cuirass type respirators which were quite inadequate, their main method of artificial respiration was positive pressure ventilation through a tracheotomy opening.

Since the Danish epidemic, writers in northern Europe and England (Ibsen, 1954; Smith *et alii*, 1954; Macrea *et alii*, 1954) have advocated this method of positive pressure ventilation as superior to other methods of prolonged artificial respiration. It appears that this opinion may be based upon experience mainly with cuirass respirators, which have been found here to be of little or no value in the management of the acute case, and the writers pay little attention to the tank respirator, the use of which has formed the basic method of artificial respiration at Fairfield Hospital since the work of Drinker and Wilson in 1929 and 1931, and which is favoured in the United States.

Comparison of the mortality rates amongst patients with pharyngeal and respiratory paralysis admitted to Fairfield Hospital in 1937 and 1953-1954 and those in Copenhagen in 1952 (Lassen, 1954) favours retention of the tank respirator as the basic form of prolonged artificial respiration. (Table II.)

In 1937, prior to the introduction of tracheotomy and chemotherapy, the mortality rate at Fairfield Hospital amongst 274 children aged under fifteen years was about 22%, whereas in Copenhagen in 1952 the comparative rate in 165 patients of similar age group was 35%. In Copenhagen, during the eleven years from 1934 to 1944, cuirass respirator treatment of 76 patients resulted in a mortality rate of 80% (Lassen, 1954). At Fairfield Hospital in 1953-1954, when chemotherapy and tracheotomy were used in selected cases, in conjunction with tank respiration, the mortality rate was about 22% in patients aged fifteen years or more, and 10% in those aged under fifteen years, against Copenhagen figures of 40% and 35% respectively.

Apart from these figures, the tank respirator offers advantages in nursing, is more versatile and appears to offer greater potential for development, particularly in the production of more forcible expiration and mechanical simulation of coughing (Barach *et alii*, 1952). It avoids the forcible tracheal downdraft of positive pressure ven-

[1] Read at a meeting of the Pædiatric Society of Victoria, August 11, 1954.

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TABLE II.
Cases of Pharyngeal and Respiratory Paralysis.

Age (Years).	Total Cases.			Mortality.		
	Fairfield Hospital.		Copenhagen.	Fairfield Hospital.		Copenhagen.
	1937.[1]	1953–1954.[2]	1952.[3]	1937.	1953–1954.[4]	1952.
15 and over	22	37	156	16 (72·7%)	8 (21·7%)	62 (39·7%)
Under 15	274	30	165	60 (21·9%)	3 (10·0%)	57 (34·6%)

[1] Tracheotomy not performed.
[2] Tracheotomy performed in 15 cases (50 cases classed as severe).
[3] Tracheotomy performed in 265 cases.
[4] Six of these patients died within forty-eight hours of their admission to hospital.

tilation, which opposes the physiological mechanisms for expulsion of secretions from the lower part of the pulmonary tree.

Thus there are two separate sets of circumstances in relation to which tracheotomy may be considered: the first, in which adequate facilities for tank respiration are available close at hand when tracheotomy may be carried out in selected cases; the second, in which the number of cases exceeds the facilities at hand through their occurrence either in great numbers or in a more remote place necessitating travel. Under these conditions positive pressure ventilation through a tracheotomy opening is probably the method of choice to maintain the patient until tank respiration is possible.

Positive pressure ventilation is used in conjunction with tank respiration when the patients are removed for toilet purposes and physiotherapy.

Indications for Tracheotomy in Conjunction with the Tank Respirator.

In poliomyelitis, as in other diseases, the purpose of tracheotomy is to provide and maintain an efficient airway.

Obstruction to the airway occasionally results from laryngeal spasm, but is usually due to the accumulation of oral and tracheal secretions in patients who cannot swallow or cough efficiently as a result of pharyngeal or respiratory weakness.

Not all patients with pharyngeal or respiratory paralysis require tracheotomy. *In 1953-1954, 67 patients with pharyngeal or respiratory paralysis were admitted to hospital (excluding the patients who had palate paralysis alone). Of these, 50 were classed as severely paralysed and 32 required prolonged artificial respiration, whilst 15 required tracheotomy. The patients who did not require artificial* respiration were treated by postural drainage and pharyngeal aspiration after the introduction of a gastric tube.

Tracheotomy was performed on a few of these patients whilst their respiration was adequate, in the hope that *relief from the obstructive pooling of secretions would* enable them to maintain themselves without artificial respiration. It happened that all these patients subsequently required artificial respiration also.

In some cases in which there was respiratory failure only without laryngeal obstruction (*"dry" cases), artificial* respiration only was indicated initially; in a few of these subsequent pharyngeal paralysis, or the excessive accumulation of secretions even though swallowing was not wholly deficient, necessitated tracheotomy whilst the *patient was in the respirator.*

For the patients in whom respiratory weakness demanded artificial respiration, and who were also accumulating fluid, however little, in the pharynx, it was concluded that tracheotomy was necessary before they were placed in the *respirator. It has been found, particularly in patients* who have some remaining respiratory ability, that when they enter the respirator, initial incoordination in swallowing may lead to laryngeal obstruction through the aspiration of oral secretions and perhaps laryngeal spasm.

Tracheotomy Site.

A "high" tracheotomy through the second and third tracheal rings is most suitable, as it allows neck space for the respirator collar seal. The tank respirators are fitted with a curved bar to keep this collar from overriding the tracheotomy tube.

Management of Tracheotomy.

Tracheotomy provides a means of removing by suction secretions which may have been aspirated or which have migrated from a lower part of the pulmonary tree. The tracheotomy tube requires constant nursing attention to keep it clear, and repeated instillation of sodium bicarbonate solution is necessary to prevent the incrustation of secretions in the trachea. *After the initial few* days of the acute stage of the disease, pulmonary infection becomes an added hazard, which is now minimized by the wide range of bactericidal agents available.

Removal of Tracheotomy Tube.

Removal of the tube from patients who ultimately regain respiratory function and an adequate cough presents little difficulty when infection and the volume of tracheal secretion are reduced by antibiotics and physiotherapy.

Difficulty arises in the removal of the tube from patients who are unable to leave the respirator for more than a few minutes, and whose respiratory power is insufficient to expel mucus from the trachea. These patients become mentally dependent on the tracheotomy, even though little or no mucus is being aspirated, and an almost voluntarily "retained tube" may result. The same applies to other patients after they leave the respirator; but ultimately *removal of the tube is possible after progressive reduction* in its size until the patient's confidence in his own power to cough is restored.

Complications in Relation to Tracheotomy.

Pulmonary infection, usually staphylococcal bronchitis, is more frequent and prolonged in patients with a tracheotomy in a respirator than in similar patients without a tracheotomy.

Pulmonary collapse is prevented to some extent by the tracheotomy, in that secretions are readily removed, and aspiration into the lungs of oral fluids (saliva, mucus and vomitus) is prevented. The tank respirator, which is *capable of simulating a cough, appears to be the best* prospect for the treatment of pulmonary collapse, whilst a respirator in which expiration is moderately forcible appears likely to provide the best method of minimizing bronchial plugging. For the patient who can be maintained out of the tank respirator for short periods with the aid of positive pressure ventilation, postural drainage with thoracic percussion is a moderately efficient method of *treatment.*

Summary.

The increasing number of adult patients with poliomyelitis has intensified the problems of management, since a higher proportion of adults is paralysed, the paralyses *are more severe, and cases of pharyngeal or respiratory* involvement are more frequent than in children.

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The improvement in the prognosis for patients with pharyngeal or respiratory paralysis since 1937 has been ascribed to chemotherapy and tracheotomy.

Tracheotomy in poliomyelitis is employed in selected cases when adequate facilities exist for the management of the cases which occur, or it may be used as a necessary adjunct to intratracheal positive pressure ventilation when this is used as an emergency method of artificial respiration, as illustrated by its use during the Copenhagen epidemic of 1952.

Since the Copenhagen epidemic in 1952, writers in Northern Europe and England have advocated intratracheal positive pressure ventilation as a better basic method than other forms of artificial respiration for poliomyelitis. This assumption is not borne out by a comparison of the mortality figures from the Fairfield Hospital, where the tank respirator forms the basic method of prolonged artificial respiration, in 1937 and 1953-1954, and from Copenhagen in 1952. The relevant details are described.

Apart from these figures, the tank respirator offers advantages in nursing and appears to offer greater potential for development.

In poliomyelitis as in other diseases, the purpose of tracheotomy is to provide and maintain an efficient airway.

Obstruction to the airway occasionally results from laryngeal spasm, but is usually due to the accumulation of oral and tracheal secretions in patients who cannot swallow or cough efficiently as a result of pharyngeal or respiratory weakness.

The circumstances under which tracheotomy is performed in conjunction with the use of the tank respirator are described.

The management and complications of tracheotomy in association with prolonged artificial respiration are described.

Acknowledgement.

I wish to acknowledge the assistance I have received from Dr. H. McLorinan, who supervised the management of cases in both these epidemics at Fairfield Hospital.

References.

BARACH, A. L., BECK, G. J., BICKERMAN, H. A., and SEANOR, H. E. (1952), "Physical Methods Simulating Cough Mechanisms", *J.A.M.A.*, 150: 1380.

DRINKER, P., and MCKHANN, C. F. (1929), "The Use of a New Apparatus for the Prolonged Administration of Artificial Respiration; a Fatal Case of Poliomyelitis", *J.A.M.A.*, 92: 1658.

FAIRFIELD HOSPITAL (1938), "Report of the Board of Management for the Year Ended June 30, 1938".

IBSEN, B. (1954), "The Anæsthetist's Viewpoint on the Treatment of Respiratory Complications in Poliomyelitis during the Epidemic in Copenhagen, 1952", *Proc. Roy. Soc. Med.*, 47: 72.

LASSEN, H. C. A. (1954), "The Epidemic of Poliomyelitis in Copenhagen, 1952", *Proc. Roy. Soc. Med.*, 47: 67.

SMITH, A. C., SPALDING, J. M. K., and RUSSELL, W. R. (1954), "Artificial Respiration by Intermittent Positive Pressure", *Lancet*, 1: 939.

WILSON, J. L. (1931), "Types of Respiratory Failure in Poliomyelitis. Indications for Use of the Drinker Respirator", *New England J. Med.*, 205: 957.

DEEP X-RAY THERAPY IN GYNÆCOLOGY.[1]

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THE use of deep X-ray therapy with conventional voltage as a sole therapeutic method of treatment in malignant disease in gynæcological conditions may not infrequently fail to eradicate the disease. Briefly, the reasons for this are as follows: (i) Many patients are large, and it is impossible to give an adequate dose. (ii) In the more advanced cases large volumes of tissue have to be treated, and the patients, who are already in chronic ill health, are unable to tolerate an intensive course of treatment.

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on September 30, 1954.

(iii) Most of the tumours that are found in the female genital organs are of limited radio-sensitivity, and this means that a relatively large tumour dose has to be given, which is sometimes impossible with the apparatus available here.

I may just mention that we radiotherapists hope that this will not always be the case. At present nearly every radiotherapy centre around has a supervoltage plant, or plans are laid down for its early installation. By means of these units it will be possible to attempt to eradicate malignant disease situated deeply in the body, as adequate tumour doses will be possible; but at present deep X-ray therapy finds its greatest use in conjunction with either radium or surgery.

However, to commence with, I should like to say a few words on X-ray therapy in non-malignant conditions.

Secondary Amenorrhœa and Sterility.

For a number of years Kaplan and other workers in America have used irradiation in secondary amenorrhœa and sterility of pituitary or ovarian origin. In all cases these patients are referred by the gynæcologist, and only when other methods have failed. Just how irradiation works to correct amenorrhœa and sterility is still not definitely known, although many theories have been advanced. This form of therapy is known as stimulation therapy, because in an unknown manner it causes an increase in hormone production and increased activity in a gland that shows no cytological change. It would appear that it is a biochemical change that takes place—such as changes in cell permeability, and rearrangement of electrons, atoms and molecules.

Naturally many gynæcologists are still in doubt about its safety and its efficiency. However, reports are now available of its use in some hundreds of cases in America, and there has been no report of its adversely affecting either the patient or her offspring. Of its efficiency in a proportion of cases there is no doubt. Also, Mazer and Israel state that only seven of 480 patients so treated by them experienced an aggravation of the amenorrhœa. They also observed for five years the effects of low-dosage irradiation on the ovaries of 50 regularly menstruating women. In only one of them did amenorrhœa ensue—an incidence approximately the same as that spontaneously acquired in untreated regularly menstruating women.

Prior to the commencement of X-ray therapy pregnancy must be excluded, and sexual relations should be forbidden till the completion of treatment, in order to avoid the possibility of conception whilst treatment is in progress.

The usual technique is to irradiate the ovaries and pituitary. This is carried out in three visits at weekly intervals. On the first day 100*r* are given to the pituitary and 50*r* to the ovaries. This is repeated at the next two visits.

With regard to results, Kaplan in 1949 reviewed 334 cases; 33 of the patients were unmarried and 301 married. Two hundred and seventy-four patients were followed up; favourable results were obtained in 12 unmarried and 198 married women. In nine unmarried and 55 married women treatment failed.

In the favourable result group of 198 married women, after regular menstruation 90 fell pregnant and delivered 101 normal children. Thirty-two additional patients fell pregnant, of whom 18 miscarried, two had ectopic pregnancies, one had a stillborn infant, three gave birth to normal children who died shortly afterwards, six aborted (some intentionally), one had an abnormal birth, and in one case therapeutic abortion was performed.

At the International Congress of Radiology Kaplan reported on the grandchildren of women who had been irradiated. They were all physically and mentally normal in every way.

Our experience at Royal Prince Alfred Hospital in the past five years shows the results. There were 42 patients, 10 unmarried and 32 married; 11 are untraced. Treatment was successful in the case of three unmarried women and

17 married women; of these 17, 10 had menstrual periods only and seven also became pregnant. Treatment was a failure in the case of three unmarried women and eight married women.

Hence it can be seen that irradiation properly administered is harmful neither to the mother nor to the offspring, and is a valuable therapeutic procedure in certain cases of amenorrhœa and sterility.

Artificial Menopause.

X-ray therapy is also used for the production of an artificial menopause. The indications for its production should be discussed by the gynæcologist rather than by a radiotherapist. The following are the usual indications: (i) breast carcinoma in young women, (ii) menopausal menorrhagia and *metropathia hæmorrhagica*, (iii) *fibrosis uteri*, (iv) endometriosis (some cases), (v) cardiac and other systemic diseases—for example, tuberculosis.

I would say that in no case is it permissible to produce the menopause without a preliminary examination of the patient under anæsthesia, and a dilatation and curettage and examination of the tissue scrapings. This is so because nearly all the patients are suffering from symptoms associated with malignant disease, which must always be excluded.

After treatment the patient usually has one more menstrual period of the type to which she was accustomed, then one short period, and then amenorrhœa. The reappearance of the menstrual period in a woman aged over forty years after the establishment of the artificial menopause is so rare that it calls for immediate investigation, in case malignant disease is present.

The technique used for the production of the artificial menopause is simple; usually the treatment is carried out in two exposures on consecutive days, a dose of 600*r* to the ovaries being given, or 450*r* in one exposure. Usually an anterior and a posterior field are used, 15 by 10 centimetres in area or larger if the patient is large, at the level that will include the ovaries. With few exceptions patients tolerate this treatment with no effect other than possibly some slight nausea, which usually passes off in a day or so. Should the patient be very fat, then radium may be preferred.

There are several reasons why X rays are preferred to the use of radium for the production of the menopause, as follows: (i) The use of X-ray therapy avoids the risk of missing an early malignant tumour of the uterus. If radium is inserted, the immediate result is to cause local healing and the hæmorrhage stops. However, the disease infiltrates and advances, and the patient returns with a well-established carcinoma. X-ray therapy, on the other hand, in the dosage used, has no effect upon the local uterine lesion and the hæmorrhage continues, which causes immediate investigation. (ii) Some gynæcologists may use considerable amounts of radium with local scarring and telangiectasis. It is possible that many years later bleeding from telangiectatic vessels may make hysterectomy necessary. There is also the possibility that it may predispose the patient to cancer of the body of the uterus in later years.

There are two main complications of X-ray therapy, both of which appear to be exaggerated. One is the production of severe menopausal symptoms. Tod, of Manchester (who has probably had more experience than most people), states that menopausal symptoms are little if any more severe than those expected with the normal menopause, and are a small price to pay for the elimination of symptoms which produce chronic ill health. The second question is that of carcinogenic effects of the irradiation upon the uterus. In the human being subjected to irradiation one of two things may happen: (i) in cases of prolonged exposure to small doses (for example, fluoroscopic examination in the early days) dermatitis or possibly such systemic diseases as aplastic anæmia or myeloid leuchæmia may occur; or (ii) the dose may be so high that scarring and telangiectasis result, and years later the scar breaks down and becomes carcinomatous. The first objection does not apply; and the second, which concerns X-rays, is not applicable either, as the dosage used is low.

Hence it appears that X-ray therapy is a safe method for producing the artificial menopause in any woman aged over forty years who is being partially incapacitated by disordered menstruation not associated with any other pathological condition.

Malignant Conditions of the Genital Organs.

We now turn to the use of X-ray therapy in malignant conditions of the genital organs.

Carcinoma of the Vulva.

The incidence of carcinoma of the vulva appears to be about 3% of all genital carcinomata. It occurs in women aged over sixty years, and is often superimposed upon *leukoplakia vulvæ*. Histologically the growth is a squamous epithelioma, except in the cases in which it occurs in Bartholin's glands. From its histology and accessibility the growth appears to offer a splendid chance of cure by X-ray therapy or radium. This is far from being the case, however, for the following reasons: (i) the vulva at the best of times stands irradiation badly; (ii) these growths are already on devitalized and atrophic tissue with a diminishing blood supply; (iii) continual moisture and friction are present.

Hence an adequate tumour dose is apt to be followed by radio-necrosis, possibly not for some time or in all cases, but the chances of its development are greater than in other areas. Also, as was mentioned before, carcinoma occurs in leukoplakic areas, and later, if one tumour is cured, it appears likely that a further primary tumour may occur in other potentially malignant areas.

It appears that radical surgery which removes all potentially malignant areas, as well as removal of nodes in both inguinal regions, and external iliac, internal iliac and obturator nodes, offers the best chance of survival.

However, should surgery be contraindicated, then X-ray therapy may be of value in advanced cases, in preventing hæmorrhage and foul discharge, which are the lot of these unfortunate women. The dosage used should not be high and may be given in eight exposures. With smaller tumours treatment may be more radical, and some five-year survivals have been reported (Bowen, 13%).

Carcinoma of the Urethra.

X-ray therapy has little to offer in the treatment of carcinoma of the urethra. Each case must be judged individually, and no set routine can be laid down. It may be said that carcinoma of the urethral orifice is probably best treated by a radium implant, whilst carcinoma at the vesical end probably requires radical surgery, including partial cystectomy, transplantation of the ureter and ablation of the pelvic organs.

Carcinoma of the Vagina.

Carcinoma of the vagina is rare, and if a localized tumour of the vagina is found, then carcinoma of the cervix or body of the uterus must be excluded.

Histologically these growths are squamous-celled carcinomata, except when rarely a sarcoma is present.

The results of treatment either by surgery or by radiotherapy are bad.

If the growth is treated, then a radium needle implant may be used (delivering 6500*r* to 5500*r* in five to seven days, depending upon the area treated). If the growth is more extensive and involves a greater part of the vagina and yet does not infiltrate more than one or two centimetres, then intracavity implantation of radium may be used. A thick rubber sponge running the whole length of the affected part of the vagina is inserted, and the radium should be placed in tandem. A safe dose is to give 5000*r* at the surface of the applicator over forty-eight hours and then repeat the dose in seven days. If the growth is still more advanced with fixation of the vault, then palliative X-ray therapy may be of value. The

patient is treated over four or five weeks, and an estimated tumour dose of 4000*r* is given to the pelvis to include primary growth and affected glandular areas.

Absolute cure rates of about 20% have been published.

Carcinoma of the Uterine Cervix.

Carcinoma of the uterine cervix is by far the commonest malignant tumour of the female genital tract. Willis states that uterine cancer causes about 12% of the female deaths from cancer.

Much has been spoken, written and argued about the best method of treatment of carcinoma of the cervix; but this is not the place to discuss whether surgery or radiotherapy is the method of choice. It appears to me that either method, in well-trained hands, brings about good results. However, I should like to say a few words about the radiotherapeutic approach to the problem, even though many of you are primarily interested in the surgical aspect of the problem. There must be quite a number of patients who, for reasons such as systemic disease, extent of the malignant growth, age, obesity and poor general health, must depend upon radiotherapy. There is also another group in whom the growth is inoperable and who should be given the benefit of planned treatment.

Although the subject of the talk tonight is deep X-ray therapy in general, as carcinoma of the cervix is the commonest tumour of the genital tract, I hope you will bear with me a little whilst I tell you of the combined treatment by radium and X rays.

Of recent years, English centres (principally the Holt Radium Institute at Manchester, which I shall quote) have attempted to place the radium and X-ray treatment of this disease upon a firm physical basis, rather than on the empirical system which previously existed. This has to some extent enabled other centres to use a system which has taken many years to evolve.

At Manchester they have selected an index point which is anatomically comparable from patient to patient. It also allows correlation between dosage and clinical effect. This point has been designated point *A*, and it can be found by measuring two centimetres up from the last intrauterine tube and then two centimetres laterally in the same plane as the uterus. Point *B* lies a further three centimetres laterally and is approximated to the site of the obturator gland. Over a period of years they have found the optimal ratio between intrauterine and vaginal radium to be 1·6:1·0. This ratio has also been chosen as being ideal by Kottmeier, of Stockholm.

It has been shown by Tod and Meredith that for treatment an optimum dose is of the order of 8000*r* to point *A*, if it is given in two sessions of about three days each, with a four to seven day interval. In patients aged over sixty-five years this is reduced to 6500*r*. If supplementary X-ray therapy is to be given, they advocate 3000*r* to the parametrium (point *B*) in four weeks. In this case the optimal radium dose to point *A*, 6500*r*, is given in two sessions, one at the beginning and one at the end of the X-ray treatment.

It must be added that at each radium insertion the patient is radiologically examined to determine the position of the radium; if the position is unsatisfactory, the patient is returned to the operating theatre and the radium is reapplied.

Supplementary X-ray therapy should be used in all but the earliest of cases, as it must be assumed then that the disease has spread beyond the cervix. This, of course, has been clearly shown by Taussig, who found that in 34% of a series of cases of Stage II carcinomata lymph node metastases were present. The intracavity radium also irradiates the pelvic wall, but, as is well known, the dosage falls off rapidly as the distance from the source is increased. Kottmeier has measured the dose received by the pelvic lymph nodes *in vivo* during a bilateral extraperitoneal lymphadenectomy whilst the radium was still *in situ*. The doses to the lateral pelvic wall ranged from 2000*r* to 600*r*, the average dose being 1000*r*. Hence there is a real benefit in giving X-ray therapy, as a dose of 4000*r* or possibly slightly more appears to be cancericidal to sensitive tumours.

The results published abroad, especially in Sweden and Manchester and at the Marie Curie Hospital, show that by means of radiotherapy a relative cure rate of 42% for five years is obtained. This, of course, includes growth in Stages III and IV—those that are usually rejected by the surgeons as being inoperable. Also in Sweden, among over 2000 patients examined only 3·8% were deemed to have growths too advanced for any form of radiotherapeutic treatment.

Although X-ray therapy is seldom used by itself as a primary method of treatment, it is interesting to note that Baclesse, of the Curie Foundation in Paris, at the International Congress of Radiology in 1953, reported on a series of 97 patients whom he had treated from 1930 until 1946. All growths were in Stage III or IV, and of the patients 21 lived from five to twenty-one years. Baclesse used as many as eight fields, and the treatment time varied from six to twelve weeks.

If it is intended to use combined radium and surgical treatment, then Way, of Newcastle, recommends a two-thirds dose of radium, followed by a Wertheim operation in six weeks. He is also using cell counts to assess whether a tumour shows a favourable or unfavourable response to radium therapy; when the response is unsatisfactory he follows radium therapy with either a lymphadenectomy or Wertheim operation. As yet it is too early to assess his results, but they are awaited with much interest.

It appears to me that results show that in the operable group surgery or radiotherapy or a combination gives good results; but I should like to make a plea for more interest to be taken in the radium treatment of the more advanced carcinomata—that is, the rejected or inoperable growths. Today there is no justification for putting in a little radium and hoping for the best. These patients must be given their chance as well as those with early growths.

There has always been doubt in people's minds about the value of X-ray therapy in the treatment of glandular areas. This appears to be more academic than practical, as it is very difficult to prove whether or not the glands are sterilized by the therapy. However, most radiotherapists have had experience in treating glandular masses in the neck; these are usually squamous carcinomata of varying degrees of differentiation, and although I really believe that no one can tell how the particular gland will respond, even on histological grounds, some surprising results are obtained. At a dosage that it is possible to give the pelvis large masses of well-differentiated squamous cell carcinomata of the neck are rendered sterile for many years. That this also must happen in the pelvis is shown by the results of combined radium and X-ray therapy from the *Radiumhemmet*. The results in 580 cases were as follows: Stage III, 145 (25%) patients alive and well five years later; Stage IV, 156 patients, 18 (11·5%) of whom were alive and well five years later. Pain from localized bony metastases usually responds well to local X-ray therapy to the affected part.

In cases of recurrence after operation X-ray therapy may be of temporary benefit. In cases of recurrence after radium and X-ray therapy no further irradiation is indicated.

I shall say a few words about complications of treatment when dealing with ovarian tumours; but these patients are best treated in hospital, where good nursing facilities are available, and they can be given an adequate diet, blood transfusions *et cetera*.

Carcinoma of the Uterine Body.

Carcinoma of the uterine body is much less frequent than carcinoma of the cervix—about one case for every five. These growths are usually post-menopausal, 75% of the patients being aged over fifty years. The pathological basis ranges from superficial papillary *adenoma malignum* to anaplastic or diffuse carcinoma. With the wide network of lymphatics these growths can spread from the paraaortic group of glands to the inguinal group as well as to the external iliac group.

Unlike carcinoma of the cervix, the opinion of most workers is that if these growths are operable surgery is the best method of treatment. The lone dissenter is Heyman, who believes that radiotherapy is the method of choice and, should that fail, then hysterectomy. His results are good; 316 (58%) of his patients showed no recurrence in five years. Twenty-two additional patients were cured by hysterectomy. The over-all rate of five-year survivals was 65%.

In operable cases, in which the growth has been found to be confined to the endometrium or uterine wall, then little purpose is served by giving X-ray therapy. If the growth has spread to the serosal wall or extended to adjacent removable organs, then I think a post-operative course of X-ray therapy justifiable. In these cases, unfortunately, the whole of the lymphatic drainage cannot be treated with a high dosage, so only the contents of the pelvis are treated by as small fields as possible in order to attain a dosage of 4000*r* in four or five weeks.

In some obese or elderly patients this will not be possible, and they should be watched; should a recurrence take place, then palliative X-ray therapy may be of value—this, of course, to a much lower dosage.

In patients who have early growths but for some reason are poor surgical "risks" or refuse operation, the method of choice is the intracavity implantation of radium alone, and if the growth is more advanced, radium *plus* X-ray therapy to the pelvic walls. As the growths are most commonly confined to the body, then most of the radium must be placed in the uterine body itself—that is, a different technique from that used in the treatment of carcinoma of the cervix.

Uterine body carcinoma often metastasizes to the vagina, and in cases of localized recurrence either radium implant or intracavity implantation of radium may deal with it satisfactorily.

Sarcomata of the uterine body are more maligant, and in all cases should, I believe, receive a post-operative course of X-ray therapy, in the manner described above. Chorion-epithelioma usually does not respond.

Ovarian Tumours.

We lastly turn to X-ray therapy in ovarian tumours. As yet there appears to be no suitable clinical classification, and it seems that every pathologist tries to produce a still more complicated and scientific one, based on histogenic origin. These classifications are all too unwieldy and far from practical. However, to have some idea of the tumours for which radiotherapy is indicated, some simple classification is desirable, and I suggest the following:

1. Tumours with endocrine significance: (*a*) granulosa cell tumours (40% malignant); (*b*) arrhenoblastoma (20% malignant).

2. Tumours with no endocrine significance: dysgerminoma.

3. Epithelial tumours: (*a*) Papillary carcinoma and cystadenoma with epithelial changes identical with those seen in invasive carcinoma; (*b*) malignant tumours: (i) primary ovarian tumours; (ii) ovarian carcinoma in serous and pseudomucinous cystadenoma.

Granulosa Cell Tumours.

Granulosa cell tumours occur in all ages, though most occur after the menopause. In the young they produce sexual precocity. These are usually unilateral and well encapsulated. Most of them are benign, although Kottmeier records 17% recurrence in five years. Surgical treatment is the method of choice, and if there is some doubt about the degree of malignancy, then X-ray therapy may be worth while.

Arrhenoblastoma.

Arrhenoblastoma is a rare tumour, and produces signs of masculinization, including amenorrhœa, sterility, atrophy of the breasts and uterus, and hairiness. These tumours appear before the menopause and are unilateral. They are probably more malignant than the granulosa cell tumours, and surgical treatment again is the method of choice. Again, if a question of malignancy or incomplete removal arises, then post-operative X-ray therapy is advisable (Crabb).

Dysgerminoma.

Dysgerminoma occurs in young women aged under twenty years; it may be unilateral, but in 20% of cases the tumours are bilateral. They are well defined. They are usually malignant and capable of metastasis, in a similar way to the seminoma, in the chest, neck and paraaortic nodes. The treatment is primary operation followed by abdominal irradiation to include the paraaortic group of glands. These tumours are usually very radio-sensitive.

Epithelial Carcinoma.

The epithelial carcinomata are the most frequent of the ovarian tumours. These are solid, more or less cystic or papilliferous growths, and may develop in the walls of the serous or pseudomucinous cystadenomata or primarily in the ovaries.

Primary radical operation is the treatment of choice in all cases, even if the growth is inoperable, to remove as much growth as possible. This is followed after operation by radical X-ray therapy if the tumour is in one of the following groups: (i) ovarian tumour showing features of malignancy, but with no stromal invasion; (ii) ovarian tumour, clinically and microscopically malignant.

A large series of cases has been reported by Kottmeier at the *Radiumhemmet* and the results are extremely good.

TABLE I.

The Results of Treatment of 418 Patients with Proved Ovarian Carcinoma at the Radiumhemmet from 1938 to 1946.

Patients.	Alive and Well After Five Years.
Patients referred after primary radical operation, 140	71 (50·7%)
Patients referred for recurrence after radical operation, 58	15 (25·9%)
Patients referred after incomplete operation, 127	11 (8·7%)
Patients with inoperable tumours 93 ..	4 (4·3%)
Total, 418	101 (24·2%)

In the X-ray treatment of epithelial ovarian tumours one must compromise a little and depend upon the surgeon's findings in order to estimate the amount of the abdomen to treat. This is so because it is difficult to give the whole abdomen an adequate tumour dose in these cases, which at the best of times are not very radiosensitive.

If the growth has been completely excised and was limited to the pelvis, then treatment should be given to the lower half of the abdomen — the paraaortic nodes excluded.

If the growth showed seeding in the bowel or mesentery, then the whole abdomen must be treated.

If the growth was solid and completely pelvic in position, and if at laparotomy it was inoperable, then again only the pelvis must be treated, and as high a tumour dose as possible given. No definite dosage can be set down, but as high a tumour dose as possible is given.

Complications.

With regard to X-ray therapy to the pelvis and abdomen, one is sometimes limited to the amount of treatment that is tolerated by the patient because of (i) effects on the hæmatopoietic system, (ii) nausea, (iii) diarrhœa, (iv) cystitis.

A close watch is kept on the white cell count and, provided that it does not fall below 2000 per cubic millimetre, there is no risk of permanent hæmatopoietic damage. The

nausea and vomiting can be controlled today by "Andromine" and pyrodoxine injections. However, if these are persistent, then a lower daily dosage may help. Diarrhœa and cystitis are difficult to control, but the usual remedies are helpful. Diarrhœa may persist for several weeks after treatment, but inevitably decreases. With large field irradiation these patients are best treated in a suitable nursing hostel, where vitamins, adequate diet and rest are available. The course of five weeks' treatment is very strenuous, and the patients must be "jollied" along.

MEETING OF DISEASES.

By CHARLES ENGEL,
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THE title, "meeting of diseases", is a misnomer, of course. There is no such thing as a meeting of diseases. Well known and often quoted is the time-honoured French saying: "There are no diseases, but only sick people." There is no meeting of diseases; there are only unlucky people, who, being already sick from one disease, contract an additional new one and have now to suffer more than before. But we have to give some name to this happening, and to my mind the phrase covers the subject very well. Would other expressions such as "accession", "association", "supervention", "superimposition", "intercurrence", "coexistence" of diseases be more appropriate? I wonder. And is it not alluring to give a paper a nice heading? So I will adhere to the original expression.

Meeting of diseases does not mean just meeting of provocative agents. The latter occurs very frequently. But it happens rather rarely that a disease is caused by the simultaneous action of two different agents, as seems probable in Vincent's angina caused by both spirilla and fusiform bacilli. During World War I it happened more than once that the drinking water in one theatre of war (Galizia) was found to be polluted with *Vibrio choleræ*, dysentery bacilli and *Eberthella typhosa* equally. On such occasions mostly one of the agents prevailed and produced one disease. Exceptionally, more of them brought about diseases in the same individual independently of each other. In that same war, one of my colleagues came down with cholera, dysentery and typhoid fever at the same time. After the watery stools came the bloody ones, and then he had a high temperature for four weeks; from the blood *E. typhosa* could be cultivated.

Diseases meet very often. They meet every day everywhere in thousandfold combinations. Their meeting is mostly quite a trivial event or one of slight importance. But it may turn out to be a very serious happening. It may mean a critically heavy overburdening of the already not intact organism with serious consequences, and not infrequently with a fatal outcome.

Very much less frequent is the reverse, that the new disease has a curative effect on the old one. But the knowledge of such an action is probably as old as medicine itself. It can be traced back to the early times of dawning civilization. Hippocrates described it. Experience with such cases was the source of many treatments that I will mention later. In 1795 a paper was published on the subject with the heading "An Inaugural Dissertation on the Influence of One Disease in the Cure of Others" (Ashton, quoted by Hench, 1940). Within some decades it happened twice that observation of the curative effect of one disease on another, and the logical deduction from this observation, resulted in a therapeutic discovery of great importance; and in both cases it resulted in a Nobel prize too. It was not purely fortuitous, not a chance discovery in either case, not "*Forscherglück*" (the good luck of the research men), as such happenings are so often described in the history of science. In both cases it was the result of a deliberate, persistent and careful observation of the scientists over a very long time.

Since the eighties of the last century, Wagner-Jauregg has studied the salutary effect of acute febrile diseases on patients with mental disorders, particularly on those with general paresis. He discussed it first in 1887. Thirty years later, in 1917, he introduced and recommended the inoculation of malaria as routine treatment of general paresis. Until that time the disease was unanimously considered as incurable. With malaria inoculation it could be fairly well cured in most cases. It was a striking discovery indeed, as it was well known that intercurrent febrile diseases generally affected the course of syphilis unfavourably (Stokes *et alii*, 1944).

History has repeated itself in recent years. Hench has been studying and registering the beneficial effect of jaundice and of pregnancy on rheumatoid arthritis over many years (Hench, 1940). He also observed that rheumatoid arthritis was sometimes dramatically relieved after an operation (Hench, 1949). Since he had reason to suppose that pregnancy, jaundice and the operation all stimulated the adrenal cortex, the question arose whether an adrenal hormone might not be the common beneficial factor. This consideration resulted in an intensive study of the effect of the adrenal cortical hormones, and led eventually to the cortisone therapy of rheumatoid arthritis.

Meditating about this curious happy coincidence, or rather about the succession of such significant discoveries, I got the idea that we might benefit from it. I thought it would be useful to compile the most important data of the material so far known in this field. So I present it here with the hope that it may be of value and may pay dividends.

Let me point out here that it is beyond the scope of this paper to deal with the secondary infections and with complicating diseases produced by them—for example, erysipelas following an open fracture, pneumonia after an operation, and so on. Also I think it would be beyond the scope of the present paper to deal in detail with the commonly occurring case in which one disease provides the terrain for the development of quite another type of disease. Such combinations of ætiological relationship are not rare and are always of paramount importance. On the basis of chronic gastritis a gastric ulcer may develop; a gastric ulcer may be the precursor of cancer of the stomach in the same manner as cancer of the gall-bladder follows chronic cholecystitis. Cancer of the stomach is almost certainly more common in patients with pernicious anæmia than in other people of the same age group. Anthracosis and silicosis of the lungs predispose to tuberculosis of the lungs, and it is quite certain that on the basis of industrial lung diseases due to arsenic, chromium, nickel and radioactive substances, cancer of the lungs can develop. There is a diversity of opinion about naming the co-development of the two different conditions. Some authors call the situation "complication sequelæ", others talk about "fortuitous coexistence of ulcer and cancer"; but the great majority of experts talk plainly about a consecutive second disease (*"Zweite Krankheit"*—Rössle, quoted by Assmann *et alii*, 1939.)

The post-mortem examination reveals without doubt that the lesions encountered in the corpse can hardly ever be attributed to a single cause, to a single disease. This may happen in early youth. However, the greater the age of the patient who has succumbed to the disease, the greater is the probability that the fatal disease has befallen an organism which already harboured another disease or other diseases. In the course of decades, man contracts one or another chronic disease almost without exception. One develops tuberculosis, another syphilis, a third acquires diabetes, a fourth becomes abnormally obese, and some or all may develop arteriosclerosis. If any of these persons develop an acute febrile disease, or another kind of acute or chronic illness, the course of the new disease is very often quite different from what it would have been if the disease had befallen a healthy organism. But on the other hand, the course of the original disease may be changed to a large extent by the intercurrent disease. For the pathologist, it is mostly not hard to come to the conclusion that the alterations found in the corpse are due

to two or more independent diseases. Usually, too, it is easy for the clinician to find out that in the given case diseases have met. But not infrequently it is a very hard task indeed to clarify the situation. The basic principle in making a diagnosis is to try to integrate all the symptoms and signs found in a patient into one well-defined disease. But there are very often symptoms and signs which at first sight, and later on too, do not fit into the pattern of a single disease. The diagnostician has to know very well that sometimes seemingly contradictory symptoms and signs belong to the same disease—for example, cirrhosis of the liver and degeneration of the basal ganglia in Wilson's disease, muscle dystrophy and cataract in *dystrophia myotonica*—and he has to know as well that in another case apparently similar symptoms are caused by two independent diseases—for example, the meeting of gall-stones with jaundice caused by cancer of the pancreas. It is sometimes hard to decide whether an organic disease has occurred fortuitously in a nervous individual, or whether there is a pathogenetic correlation between the organic disease and the nervous condition. In every such case, even the expert needs a thorough and detailed analysis of all the symptoms and signs to be able to decide whether there is one disease or a meeting of diseases.

Let us now discuss the meeting of diseases in due order. First I will deal with the detrimental effects of the meeting and afterwards with the salutary ones. But before I enter the vast field of the interference of diseases with each other, I must refer to three strictly physiological states which not infrequently and easily approach the borderline of the pathological, and in which the occurrence of a disease excites quite a different reaction from what it would have excited otherwise, or in the prime of a healthy life. These states are early youth, old age and pregnancy. Nelson (1950) makes the following statement:

> The little child is something different from being just a little man. It presents peculiarities of structure, nutrition, physiological functions and immunological reactions which are typical of its phase of development.

Because of all this, the small child responds to disease-provoking agents and particularly to the infective ones with clinical pictures that may differ from those of adults to a large extent. Let me quote one feature. The greater nutritional need of infants is the reason why the infant develops severe anhydræmia and acid-base disturbances with much greater rapidity than an adult. This abnormal "reactibility" of infants is one of the reasons why pædiatrics developed into a specialty.

But from this viewpoint, old age is surely much more important: "*Senectus ipse morbus*"—old age is a disease. Besides the inevitable atrophic changes in almost every organ of the aged, there are almost always distinct pathological alterations too, which are the anatomical background of diseases, though they may not yet have passed the threshold of latency, and therefore have caused no symptoms whatever. The most significant in this category is, of course, arteriosclerosis, especially hardening of the arteries of the heart and of the brain. If, therefore, signs herald the onset of an acute or chronic disease in an old person, this nearly always means a "meeting of diseases". A slight trauma causes fracture of bones because of their fragility, produced by senile osteoporosis. Quite a mild bronchitis may develop into a disastrous menace, if it occurs in an old patient with advanced emphysema. An incidental, mild urinary infection is a very serious incident in an old man with residual urine because of hypertrophy of the prostate. From one recent paper I quote (Saint, 1952): "Manifestations of infective hepatitis were more severe in older age than in younger patients." And who does not remember the sad picture of the once rightly dreaded "asthenic pneumonia of old people", a clinical picture widely different in appearance, and especially in prognosis, from the ordinary pneumonia of adults. We know that, because of the peculiarities of old age diseases, special geriatric departments have been installed in many hospitals in recent times. The general consensus is that their management is not such an easy task as was supposed. I feel sure that one of the main causes of this is the all too often occurring "meeting of diseases".

As important, or even more important, from the standpoint of this paper is pregnancy. Though—I hasten to repeat it once more emphatically—it is an absolute physiological state, it produces such big and important changes in the structure of woman, static and dynamic changes in the circulatory system, in the respiratory system, in the system of internal secretion, in the metabolic functions *et cetera*, that the reaction toward disease-producing agents differs often very much from that of a normal woman. Meeting of diseases with pregnancy is discussed in detail by every handbook of obstetrics. The chapters about pregnancy and heart disease, pregnancy and tuberculosis, pregnancy and diabetes (Wilson, 1954), pregnancy and acute infections are the most important items (Mayes, 1950). Every physician has ample opportunity to gain wide experience in the treatment of such patients. For me, for instance, the most remarkable experience in this field was the terrible Spanish influenza epidemic of the years 1919 and 1920 in Budapest. In the hospital wards and in a large consultative practice I examined a large number of child-bearing women with bilateral influenzal pneumonia during that time. They stood it all very poorly; the more advanced the pregnancy, the more critical became the condition. Among those nearing term only two did not succumb to the disease.

In the interaction of pregnancy and disease both conditions can be influenced unfavourably.

Syphilis is the cause of many early abortions. It is very often a catastrophe if a woman with congestive heart failure or with active tuberculosis becomes pregnant. The child-bearing may exert such a serious influence on the original disease that the urgent termination of the pregnancy becomes imperative. We find an immense literature on this question. From the long list of diseases which are influenced detrimentally I will mention the following: congestive heart failure, tuberculosis (if it is active or has recently been active), diabetes, *sclerosis polyinsularis* (Müller, 1951), severe thyrotoxicosis, borderline psychosis, otosclerosis—"There would seem to be no doubt of the deleterious effect of pregnancy on otosclerosis" (Mayes, 1950). But pregnancy has the most detrimental effect on cancer, whose course can be immensely hurried by child-bearing. Cancer in this respect is so much dreaded by both obstetricians and radiologists that some of them prohibit pregnancy even after many completely symptomless years after a successful operation (Remold, 1952). Recently Stevenson (1953) wrote interestingly about the subject. The delivery is usually the climax of the crisis in the meeting of pregnancy with diseases, especially so in the case of uncompensated heart failure. The puerperium and the time of lactation are also periods in which every intercurrent disease may affect an old one in a very adverse manner. Both conditions bring about the inclination to tuberculosis.

An important further chapter in the meeting of diseases covers anæsthesia and operation.

Anæsthesia undertaken for surgical intervention is at all times a serious disease. It may become alarming, and in a most regrettable way not uncommonly fatal. It is the prototype of the "meeting of diseases"—meeting of the anæsthesia disease with that which necessitated the operation. Wholly symptomless conditions, latent diseases, may contribute a good deal to the danger of the meeting; for instance, latent coronary sclerosis is crucial. People with different diseases react in a different way to anæsthesia. That is the reason why anæsthesia developed into a specialty with the aim to find out which kind of anæsthesia agrees the best with the disease in question (and of course with the operation to follow), and how it should be conducted.

Even a more important "meeting" of diseases is the operation itself. I must repeat again, different diseases react in a different way to the impact of the operation. For patients with some diseases the operation is a trivial event, for others it is just a slight or a more serious

stress, for a great many others again it is a great hazard, a very heavy risk. In the German literature the terms "operative and post-operative disease" are used (Eppinger, 1932). Operation brings about many profound disturbances in the organism, in the nervous system, in the circulatory system, in the respiratory system, in the digestive tract, in the metabolism, in the regulation of fluid and of electrolyte balance *et cetera*, which always need the most delicate consideration and care. That is the reason why with the development of modern surgery so many treatises have been written about the pre-operative and post-operative care of patients, books which teach how the serious "meeting" should be handled in the most adequate way to ensure safe conduct through the operation and a prompt and complete recovery. That is the meaning of Moynihan's motto: "We have made surgery safe for the patient, now the patient has to be made safe for surgery."

Because of the circumstances already discussed, operations performed on patients of the older group mean always a highly critical meeting.

I have already mentioned that meeting of diseases has nearly always a reciprocal effect. It usually produces a worsening of the old disease, a more serious course of the intercurrent disease, than would have been expected otherwise. If a child has to be admitted to hospital because of an acute infectious disease and acquires there a new infection, it is always a serious event: "Hospital infections" (cross-infections) are rightly ill famed and dreaded. The most efficient prevention of such infections is an eternal source of worry to every children's hospital administration. The importance of cross-infection is well demonstrated by the fact that a symposium was held on the subject at the annual meeting of the Australian Pædiatric Association at Canberra in April, 1954, as a result of which four papers were published in this journal.

If a patient in a tuberculosis sanatorium contracts a cold, severe influenza or dysentery, it may mean more than it would have meant for a healthy person. The same could be said for the patients in the neurological and psychiatric clinics. Well known, for instance, is the bad effect of grave acute infections on patients with disseminated sclerosis (Turner, 1952), Parkinson's disease or tabes.

If a patient with tuberculosis acquires syphilis, the course of the tuberculous disease of the lungs is generally greatly aggravated. The meeting may provoke a critical flaring-up of the original disease, which otherwise might have been well on the way to being cured.

There are one or two diseases which are exceedingly sensitive towards intercurrent diseases. The two most important in this category are diabetes and Addison's disease.

For the diabetic, the occurrence of any acute infection means a rapid deterioration of tolerance almost without exception, and sometimes it is the trigger which sets off the mechanism causing coma. In Addison's disease, severe infections of any kind may precipitate the onset of a crisis. In the same way in completely latent familial hæmolytic icterus a very severe crisis may be precipitated by a mild intercurrent disease. For example, there has been described the case of a healthy young man belonging to a family with congenital hæmolytic icterus, who suffered an almost fatal hæmolytic crisis within twenty-four hours following prophylactic vaccination against typhoid fever (Eppinger, 1937).

Furthermore, it is well known that very obese people, especially when they are not young, tolerate acute infections very badly. In earlier years pneumonia always meant imminent danger of death to them. To obese people, pneumonia was indeed "the captain of the men of death".

Acute infections may activate diseases which have been latent over many years, even over decades, or which seemed to be completely cured (cholecystitis, osteomyelitis, *pyelitis calculosa*, *et cetera*). But acute febrile diseases may precipitate the onset of other latent conditions, beriberi as well as kwashiorkor. From a completely silent hypovitaminosis or a silent nutritional disorder (protein deficiency), the most alarming symptoms of a very serious disease may suddenly develop on the first days of a complicating acute infection.

Patients with acute glomerulonephritis and children with nephrosis are very susceptible to acute infections. These children are an easy prey to pneumococcal infection. At the end of World War I, I had under my care a very large number of patients with severe war nephritis. In particular the very anæmic and œdematous people among them stood the Spanish influenza extremely badly; the epidemic took a terrible toll of them. I was able to observe the same very low resistance towards influenza among patients with severe anæmia caused by tropical malaria acquired in Albania. The mention of this intolerance gives me the opportunity to devote some words to the subject of tropical malaria.

From the standpoint of "meeting of diseases", tropical malaria is one of the most important diseases, being one of the most frequent and widespread in the tropical world. In tropical Africa, 80% of the natives have chronic malaria. In some areas—for example, Uganda—this figure is nearer to 100%. An adult native hardly ever succumbs to the disease itself. However, a very large number of them harbours in decreasing order bilharziasis and hookworm disease too (Gelfand, 1944). This combination is already much more dangerous. But the catastrophic danger for them is that this threefold combination reduces their resistance towards acute infections to an incredibly low point. Every epidemic of acute infection causes immense devastation among the natives. There is no doubt that the low life expectancy of the natives in such areas is mostly attributable to the "meeting of diseases". A combination of almost the same fatal order—incomparably much rarer, of course—is the meeting of starvation and typhus. In the forced labour camps of World War II the mortality from typhus was terrible, because the inhabitants of the camps were extremely emaciated.

I will just recall in a few words the rather rare cases in which one disease considerably enhances the resistance towards another one. Rokitansky, the pioneer of pathology in Vienna, in the middle of the last century had already shown that patients with congestive heart failure, especially mitral stenosis, were almost completely immune to tuberculosis of the lungs (antagonistic disease). Patients with hyperthyroidism are not prone to tuberculosis, but those with hypothyroidism are rather susceptible to it. Very interesting from this viewpoint is the almost absolute immunity of individuals with framboesia from syphilis. Yaws and syphilis are diseases which never meet.

Let us now deal with the main aim of the paper, with meetings in which one disease exerts a curative effect on another.

Pregnancy acts exceptionally favourably on diseases. In the first place I would mention migraine. Some women suffer migraine attacks much less frequently when pregnant. It may even happen that they are completely free of them until term. I remember two women who confessed that one of the reasons why they had so many children was that they got rid of their very frequent and very bad migraine attacks when they were with child. We have seen in the introduction to this paper that pregnancy may have a salutary effect on rheumatoid arthritis. Publications about curative effects on one disease or another are not infrequent (Blumberg, 1947; Sandweis, 1949).

The starting point in the introduction was the curative effect of artificial malaria on general paresis. I mentioned there that the experience of the salutary effect of one disease on another is very old. In the seventeenth century Tulpius, a Dutch physician, discovered that "arthritis is cured quickly and surprisingly if the patient happened to break out with smallpox" (quoted by Aschner, 1947). A similar beneficial effect was observed from intercurrent pus formation somewhere in the body, from dermatitis caused by insolation, from pneumonia on asthma, from wounds caused by trauma, from erysipelas on a new growth, *et cetera*. The observation of such a beneficial effect became—as I have already mentioned—the source

of many time-honoured treatments used by professional men and "miracle healers" equally everywhere on the globe. To this category belongs the centuries old treatment of the native Chinese physicians with heated acupuncture needles (Jefferys and Maxwell, 1910), the provocation of blistering and pustulation of the skin on or near the site of the disease (fibrositis, arthritis, neuritis), the production of an artificial ulcer on the skin (*fontanella* used already by Paracelsus and Ambroise Paré, both sixteenth century), the production of an artificial abscess under the skin or in the muscles of the buttock or of the leg, *et cetera*. When Wagner-Jauregg introduced the malaria treatment of general paresis, artificial hyperpyrexia (fever therapy) became very fashionable and was used for a large variety of diseases or rather against every kind of disease. Fever was produced by injections of milk, of tuberculin, of all kinds of protein solutions, of several kind of vaccines, especially typhoid vaccine, and by physical means (overheating). In addition to inoculation with malaria, the transmission of relapsing fever and ratbite fever (*Sodoku*) was tried too. Apart from general paresis, the best results were achieved in the domain of rheumatoid and allergic diseases and against the complications of gonorrhœa (arthritis, epididymitis).

One of the most puzzling phenomena in this field is the curative effect of some acute febrile disease on the nephrosis of children. Measles has the most spectacular effect. It may induce abundant diuresis in œdematous children, with decrease or disappearance of the œdema, diminishing of the protein content of the urine, and increase of the protein level in the blood. It may produce a remission of short duration lasting for some months. Sometimes the relapse which follows is not of such a serious character as it was before the measles. But the remission (Berman, 1951; Blumberg, 1947; Hutchins and Janeway, 1947; Meislik and Carpenter, 1948) may be of long duration, amounting to a total cure. It happens less frequently that measles does not exert any effect one way or the other on the nephrotic syndrome. A number of pædiatricians are so impressed by the salutary effect of measles on nephrosis that they systematically expose their nephrotic patients to measles, or directly infect them by intranasal inoculation of throat washings obtained from patients with early measles. Others believe that the risk of the inoculation is too grave and therefore reject this kind of treatment, especially as sometimes, as has already been mentioned, deterioration has been observed.

The beneficial effect of measles on nephrosis is therefore surprising, as I have pointed out before, since acute febrile diseases have usually a very detrimental effect on the course of nephrosis. Hepatitis has sometimes a salutary effect on nephrosis (Berman, 1951).

Inoculation with malaria has also proved beneficial in some cases (Mayes, 1950).

I have already mentioned that Hench observed amelioration of rheumatoid arthritis by jaundice. Jaundice is a symptom complex which exerts in a paradoxical way a beneficial effect on a lot of diseases (Hench, 1940; Boros, 1937).

Before the advent of cortisone, experiments were made in the treatment of patients suffering from rheumatoid arthritis by inoculation of the virus of infective hepatitis. The investigations were discontinued as the treatment proved to be an incalculably heavy risk (Gardner, Stewart and McCallum, 1945). A beneficial effect of infective hepatitis was observed in cases of intractable asthma too.

Finally, I will comment on the modern shock treatment of patients with mental disorders. It is a classical example of "meeting of diseases" and of the beneficial effect of a serious intercurrent disease on another.

Hypoglycæmia, if of major degree, is always a serious disease. Many patients with hypoglycæmia have to be urgently admitted to hospital, as they are in need of the most active and quick treatment; yet in spite of all that, it happens in a regrettable way not infrequently that patients succumb to their hypoglycæmic crises. Treatment with insulin shock consists of deliberate production of severe hypoglycæmic states with prolonged unconsciousness. No psychiatrist would deny that such a hypoglycæmic state is a serious condition.

The same holds for electric shock treatment. Unconsciousness produced by electricity, no matter what kind of electricity, is always a very serious happening. As an accident it claims victims everywhere, every day. Modern electric shock treatment, of course, induces a less severe condition, but the unconsciousness produced has always to be regarded as a grave risk. Serious complications, fracture of bones, even fatalities have been recorded (Eymar and Morris, 1950).

The knowledge that one disease may have a favourable influence on another is purely empirical. There is no knowledge of the mechanism of the process, in spite of the fact that an immense amount of work has been devoted to it. Therefore I must abstain from any attempt to discuss it. It would be a futile effort, because it is doubtful whether any clarification of the great variety of obscure theories could be achieved.

References.

ASHTON, A. (1795), "An Inaugural Dissertation on the Influence of One Disease in the Cure of Others", printed by Alexander McKenzie, Philadelphia; quoted by Hench, P. S. (1940), *loco citato*.

ASCHNER, B. (1947), "The Art of Healing", Research Books Ltd.

ASSMAN, H., *et alii* (1939), *"Lehrbuch der inneren Medizin"*, 4th Ed., 712.

BERGER, H., and ZOOLE, T. (1951), "The Relief of Nephrosis after Hepatitis", *J.A.M.A.*, 145: 228.

BERMAN, R. H. (1951), "Sarcoidosis Benefited by Pregnancy; Report of a Case", *J.A.M.A.*, 147: 246.

BLUMBERG, R. W., and CASSADY, H. H. (1947), "Effect of Measles in the Nephrotic Syndrome", *Am. J. Dis. Child.*, 73: 151. (Bibliography of all diseases influencing nephrosis.)

BOROS, E. (1937), "Hay Fever and Asthma during and after Jaundice", *J.A.M.A.*, 119: 113.

EPPINGER, H. (1932), *"Ueber den postoperativen Symptomencomplex"*, *Klin. Wchnschr.*, 11: 618.

EPPINGER, H. (1937), *"Die Leberkrankheiten"*, Springer, 359.

EYMAR, E. V., and MORRIS, H. H., JUNIOR (1950), "Deaths Associated with Electric Shock Treatment. Report of Three Cases", *Arch. Neurol. & Psychiat.*, 64: 263.

GARDNER, F., STEWART, H., and MCCALLUM, F. O. (1945), "Therapeutic Effect of Induced Jaundice on Rheumatoid Arthritis", *Brit. M. J.*, 2: 677.

GAIRDNER, D. (1952), "Nephrosis Treated by Malaria", *Lancet*, 1: 831.

GELFAND, A. (1944), "The Sick African", Stewart, Capetown, 19.

GORIN, V. (1949), "Temporary Relief of Asthma by Jaundice", *J.A.M.A.*, 141: 24.

HENCH, P. S. (1940), "The Advantages of Hepatic Injury and Jaundice in Certain Conditions Notably the Rheumatic Diseases", *M. Clin. North America*, 24: 1209.

HENCH, P. S. (1949): "The Potential Reversibility of Rheumatoid Arthritis", *Proc. Staff Meet., Mayo Clin.*, 24: 167.

HUTCHINS, G. H., and JANEWAY, C. A. (1947), "Observations on the Relationship of Measles and Remissions in the Nephrotic Syndrome", *Am. J. Dis. Child.*, 73: 242.

JEFFERYS, W. H., and MAXWELL, T. L. (1910), "The Diseases of China", Blakiston, Philadelphia, 20.

MEIZLIK, E. H., and CARPENTER, A. N. (1948), "Beneficial Effect of Measles on Nephrosis", *Am. J. Dis. Child.*, 76: 83.

MAYES, B. T. (1950), "A Textbook of Obstetrics", Australasian Publishing Co.

MÜLLER, R. (1951), "Pregnancy in Disseminated Sclerosis", *Acta psychiat. et neurol. scandinav.*, 26: 39.

NELSON, W. E. (1950), "Textbook of Pediatrics", Saunders.

REMOLD, F. (1952), *"Brustkrebs und Schwangerschaft. Strahlentherapie"*, 88: 1.

SAINT, E. G. (1952), "Infectious Hepatitis in Older Age Groups", *M. J. AUSTRALIA*, 2: 613.

SANDWEISS, D. J. (1949), "The Beneficial Effect of Pregnancy on Human Peptic Ulcer and the Beneficial Anti-ulcer Effect of the Pituitary-Adrenal Complex on Experimental Ulcers", *Harper Hosp. Bull.*, 7: 228.

STEVENSON, R. B. C. (1953), "Pregnancy and Malignant Disease", *M. J. AUSTRALIA*, 1: 508.

STOKES, T. H., BEERMAN, H., and INGRAHAM, V. R. (1944), "Modern Clinical Syphilology", Saunders, 333.

TURNER, A. T. W. (1952), *"Disseminated Sclerosis"*, *Brit. M. J.*, 2: 714.

WILSON, F. H. (1954), "Pregnancy and Diabetes: The Physician's Viewpoint", *M. J. AUSTRALIA*, 2: 87.

THE MANAGEMENT OF EPILEPTIC CONVULSIONS.

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ALL medical text-books contain a greater or lesser number of teachings which are accepted not on their merits, but only because they are in text-books. Because they are reiterated they are taken for granted; they are thought to be venerable merely because they are old. They are medical impostors who, when challenged, are found to be harmful as well as false. As with text-books, so no doubt with teachers; as with teachers, so no doubt with practitioners; each of us uses some methods which are based on mental inertia rather than on reason, and on habit rather than on intelligent experience.

When one of us has uncovered a traditional humbug of this kind, it is, I imagine, a duty to suffering humanity to make the exposure public, and in this respect my conscience has been plaguing me for years about the management of epileptic convulsions; practically every text-book repeats the same old fallacies, and the better the text-book, the greater the pity. Recently I was fortunate enough to read a copy of the 1954 edition of Professor B. T. Mayes's excellent "Practical Obstetrics", and came across the following advice on the telephoning of urgent initial treatment for a patient who has had an eclamptic fit: "Your instructions . . . will be 'a quarter of a grain of morphia hypodermically straight away . . . a padded clothes pin or spoon handy'." With the exclamation "*Et tu, Bruce!*" I set about writing these notes.

I take it that there is a recognizable entity which we may call an epileptic convulsion, which appears to be the result of an uncontrolled neural discharge, and of which the most spectacular manifestations are sudden unconsciousness accompanied by a series of violent rhythmic muscular contractions which follow a fairly regular pattern. Just what happens to the brain to bring about a convulsion is obscure, but it is clear that these convulsions or fits can be precipitated, at least in some people, by a variety of causes. It seems to be accepted that whatever the cause, the actual convulsions are, for practical purposes, identical pathological manifestations. So much being granted, it follows that what is known to be effective treatment for a convulsion *per se* caused by one agent should be effective treatment for others of different ætiology, and conversely that what is known to be useless in one class of convulsions should be useless in others. In plain terms, if I know that morphine will not stop a convulsion caused by leptazol, I shall require some solid evidence to convince me that morphine will stop an eclamptic fit.

Leptazol Convulsions.

Some years ago I had the unusual opportunity of observing the entire course of about ten thousand fits produced by the rapid intravenous injection of leptazol. They appear to be identical with the major fits of idiopathic epilepsy. Coma comes on suddenly a few seconds after the injection, and is accompanied by a gaping yawn which sometimes dislocates the jaw. The jaw is open wide for about two seconds before closing like a vice, and there is a short tonic stage, gradually but rapidly merging into the well-known clonic convulsive movements. In this clonic stage there is no phase of real muscular relaxation; any apparent relaxation is relative and momentary. The jaw does not open at this stage, nor can it be prised open except by excessive and unwarranted force. The clonic jerks come about once per second. I have timed hundreds of these fits and never found one to last more than a minute. I believe the same to be true of idiopathic fits, although this is hard to credit except on the evidence of the watch. Respiration is arrested throughout the fit, and towards the end the picture of a breathless patient in deep cyanosis with gradually ceasing clonic movements is so dramatic that in the early stages of one's experience death seems inevitable. However, with the cessation of the contractions a few deep respirations change the whole picture. Recovery is followed by some degree of mental disturbance, which may be only a mild and transient restlessness followed by sleep, or a confusional mania lasting for days, or at times a very violent confusional state exceedingly difficult to control. It was very noticeable that a patient coming round in a dark quiet room, and left entirely alone, was much less prone to become difficult than one who was irritated by light, noise or handling.

Sometimes the injection produces no fit, but a state of acute confusional anxiety most unpleasant for the patient. The causes of these "missed fits" were investigated, and it was often discovered that the patient had either surreptitiously taken a drug or been accidentally given one. When the drug happened to be a barbiturate, it was impossible to produce a fit even by large and repeated doses of leptazol. On the contrary, there were a few drugs which could be used as a premedication in order to soothe the patient, which had no appreciable effect on the fit, and the outstanding ones were morphine and paraldehyde. It became a common practice to give patients paraldehyde orally the previous evening and morphine and hyoscine by injection an hour before the fit was induced. It was also discovered that the administration of one-quarter to one-half a gramme of sodium thiopentone intravenously immediately after the fit eliminated the sometimes formidable restlessness.

We started off armed with padded spoons and clothes pegs, but soon found that these did more harm than good. On the other hand, a thin slice of sponge rubber placed evenly in the mouth kept the tongue from being protruded between the teeth and gave an even bite. The only time patient's teeth were damaged in our experience was when misguided efforts were made to protect them from damage by a small, hard object such as a spoon or clothes peg. The tongue is practically always bitten if a patient who is reasonably equipped with teeth is left unattended, because almost always as the jaws clamp together a few seconds after the fit starts the tongue is thrust forward and caught between them, and is pounded at every clonic convulsion. This can be prevented by the sponge rubber, or in default of this by a piece of cloth such as a handkerchief, held taut between the hands and placed across the lower teeth so as to hold the tongue down. Whatever is used, it must be inserted during the first two seconds when the patient "gapes". Efforts to prise the mouth open during the fit are futile.

I once saw the finger of a colleague caught between the jaws of a well-toothed patient. If it had been possible to open those jaws, opened they would have been; but the jaws remained clamped on that finger throughout the long, long minute during which the fit lasted.

Idiopathic Epilepsy.

In idiopathic epilepsy the opportunities of observing the fit in its entirety are rather rare, but a fit appears to be exactly the same dramatic phenomenon as that described above. The following points in management will be found of practical value.

If the patient has a good set of natural teeth, he will have bitten his tongue before anyone can do anything about it. Efforts to prise the teeth apart will only damage them. If he wears dentures, these should be removed as soon as possible—that is, when the convulsion has ceased. Edentulous patients with dentures rarely damage the tongue; with one or more dentures missing no possible damage can be done.

If you are there during the fit—and remember that the fit lasts less than one minute—prevent well-meaning helpers from grimly holding down the limbs. This is a serious cause of fractures. Limbs should be gently controlled, never restrained. Immediately the convulsion ceases, look for a dislocated jaw, which at this stage can easily be reduced.

Usually you will arrive after the convulsion has ceased, and your main task will be to persuade the patient's friends to leave him alone. Restraint at this stage can

irritate the patient to a state of frenzy. Often you will find a misguided friend still endeavouring to keep a spoon or clothes peg in the sufferer's mouth, adding to his irritation. At this stage the reduction of a dislocated jaw is best attempted under general anæsthesia.

If there is no evidence of *status epilepticus* and no excessive mental disturbance, an adult may be given *per rectum* six grains of sodium pentobarbital, in the form of four ordinary capsules, which will produce a valuable sleep. If there is great mental confusion and restlessness, follow the procedure for *status epilepticus*.

Status Epilepticus.

When two or more fits have occurred in quick succession, sodium thiopentone should be given intravenously until the patient is anæsthetized, about 0·5 gramme usually being sufficient. Sometimes it is most convenient to quieten the patient with a light inhalation anæsthetic in order to give the intravenous injection. When the patient is under the influence of the thiopentone, sodium phenobarbitone should be given by intramuscular injection in a dose of three to six grains. The patient should then be sent to hospital.

It is most desirable that a patient who is in *status epilepticus* should have his medical attendant at his bedside until the fits have ceased beyond reasonable doubt. Under these conditions something can be done to protect his tongue from damage in the manner described above.

Infantile Convulsions.

No experienced observer will doubt that there is at least a strong likeness between infantile convulsions and the phenomena described above. It would appear that in infancy and early childhood the basic conditions necessary before some exciting stimulus can release the neural discharge are more frequently present. The convulsions appear as concomitants to a common illness—an acute infection or a dietetic indiscretion. There is no evidence that such a child will suffer from idiopathic epilepsy in later life; nevertheless there appears to be no valid reason for treating infantile convulsions *per se* along lines differing radically from those indicated in the treatment of any other epileptic fit. Why, then, should these infants still suffer the enema and hot mustard bath which were *de fide* with the venerable pædiatricians of my student days? When producing drug convulsions I sometimes saw a patient hovering on the verge for a few seconds, and often precipitated a fit by startling the patient by clapping my hands and shouting. I believe that an enema and hot mustard bath would have been more effective.

It is occasionally necessary to administer an inhalation anæsthetic to control a convulsion, and in practice it will be found that chloroform, if available, is the most convenient. It should be used for long, usually unilateral convulsions accompanied by partial respiratory arrest and cyanosis.

Apart from such cases I have never failed to control convulsions in children by inserting one or two capsules (one and a half to three grains) of sodium pentobarbitone *per rectum*, wrapping the child comfortably in a blanket, darkening the room and keeping mother and grandma outside. Later phenobarbitone can be given orally, rectally or by intramuscular injection. Ordinary phenobarbitone tablets can be given rectally in a dose of one to four grains according to the size of the child, and this is the most convenient and effective method of administration. If paraldehyde is an effective anticonvulsant in children, then this is in marked contrast to its effect on the leptazol convulsions of adults. I have at times found it of value in subduing the restlessness sometimes found in epileptic children after a fit, which restlessness may not be subdued by phenobarbitone, and in producing sleep.

Eclampsia.

I have no claims to speak on the subject of eclampsia as a personal observer; in my practice and in those of my colleagues eclampsia has been a rare disease. However, may I offer, with all diffidence, a few remarks based on my observations of convulsions in general? Firstly, eclamptic fits appear to be the same neuro-muscular phenomenon as we have been discussing; they follow the pattern of epileptic fits occurring in the late stages of pregnancy toxæmia, with a pronounced tendency to *status epilepticus*. If this is true, they should be treated on the same general lines. I was astounded to hear recently that in at least one Australian teaching hospital some women with eclampsia are still put up in the lithotomy position and given colonic washouts with gallons of water. Short of deliberate homicide, it is hard to imagine anything more lethal and more culpable.

Leaving aside such atrocities, however, one must still ask, why do obstetricians still cling to morphine as the drug of choice in this condition? In practically every textbook one sees morphine put forward in first place, usually with paraldehyde as second favourite. I am certain that both these drugs are without any appreciable effect in suppressing leptazol convulsions, and have yet to see any evidence that they suppress any other form of epileptic fit, including eclamptic fits. Furthermore, everyone agrees that in eclampsia morphine is a dangerous drug for the unborn child.

On the contrary, barbiturates given by the intravenous and intramuscular routes have in my experience been completely successful in controlling eclamptic as well as other fits, and would appear to be without danger to the fœtus. I have performed or assisted at dozens of Cæsarean sections with the patient under straight thiopentone anæsthesia, and have had less trouble with fœtal resuscitation than in cases in which ether or nitrous oxide has been used.

In the light of these remarks, Stroganoff's deservedly famous method of handling eclamptics is seen to be simply the intelligent application of the proven principles in the treatment of *status epilepticus* to the particular *status epilepticus* which occurs in pregnancy toxæmia. Unfortunately Stroganoff was wrong about morphine. Substitute barbiturates for morphine and you have what seems to me the most reasonable method of treating eclampsia. I have no qualifications to comment on the intravenous administration of glucose as a means of improving kidney function in this condition, but it seems to me that the intravenous administration of magnesium sulphate as an anticonvulsant is less useful and more dangerous than that of thiopentone. I earnestly recommend the trial of a régime based on Stroganoff's method, but with morphine left on the shelf and replaced by barbiturates given by the intravenous, intramuscular, and rectal routes..

The other point about eclampsia is that here again you have the chance to sit at the bedside and protect your patient from damaging her tongue; but please, not with spoons and clothes pegs.

Summary.

1. Epileptic convulsions in idiopathic epilepsy, those associated with infantile disorders, and eclampsia appear to follow the same pattern and should be treated on the same general principles. Valuable therapeutic data can be obtained from observing similar convulsions produced by drugs.

2. The general principles of treatment are as follows: (*a*) protection of the patient from physical trauma and sensory irritation; (*b*) intravenous, intramuscular, rectal and oral administration of barbiturates to suppress the convulsions; (*c*) avoidance of the use of morphine and paraldehyde as anticonvulsants.

3. The treatment of infantile convulsions and of eclampsia needs careful revaluation in the light of these facts.

Reviews.

Insanity, Art and Culture. By Francis Reitman, M.D., D.P.M.; 1954. Bristol: John Wright and Sons, Limited. 8⅝" × 5½", pp. 112, with seven illustrations. Price: 12s. 6d.

THIS is not a wholly satisfying work. It seems somewhat patchy and ill-planned. Its title rather foreshadows a promise which the contents do not support. Psychiatrists may find the artistic references commendable; and artists may praise the psychiatry. It is unlikely to please both, because the author presents his material awkwardly and in a style more inclined to baffle than engage the interest of the average intelligent reader. In such a comparatively short thesis the author makes two long digressions describing the lives of George Morland and John Mytton, only to prove that in the first case an alcoholic psychotic's art shows no specific morbidity, and in the second instance that a psychopathic personality is acceptable in a certain cultural setting. On the other hand his remarks on doodling are interesting and pertinent. Doodlers are common and their productions are evidence of a hypnagogic state closely related to automatic writing and painting. Psychic art is summarily dealt with; and extended reference is made to psychotic art in non-western cultures.

Setting out to clarify the diagnostic significance of psychotic art, this author finds, after considerable meandering, that the form and stylistic appearances of such works depend on cultural factors and not necessarily on morbidity. In other words, the diagnostic value of mental patients' art is arbitrary unless other factors are taken into account. Art and psychotic symptomatology do not run parallel.

Theory and Problems of Adolescent Development. By David P. Ausubel, M.D., Ph.D.; 1954. New York: Grune and Stratton, Incorporated. 8½" × 5½", pp. 598, with one text figure. Price: $10.00.

DR. AUSUBEL has previously written a book on ego development in which he made a developmental approach to psychopathology. In the present volume he has attempted to establish that adolescence is more than a phase in personality development and that it has its own distinctive principles which he proceeds to elaborate in highly technical terms. The biosocial status of a child is disturbed abruptly during adolescent development and considerable reorganization of personality structure normally occurs. This principle may be recognized in personality studies that have been carried out on groups of children belonging to many different cultures with the widest possible variation in living conditions and range of operating stresses. In adopting this position, the author acknowledges that he is refuting what appears on the subject in most text-books, but he ranges himself alongside M. Sherif and H. Cantril and expresses himself in agreement with their ideas as formulated in their book on the psychology of ego involvement which appeared in 1947.

The subject matter of the book is an exposition of the causes for the important shifts in biosocial status during adolescence, the nature of those shifts and the consequential personality changes and behavioural manifestations.

It is announced in the preface that the book is primarily intended to be an advanced text-book for graduates in psychology and education, but that professional workers in all the various fields of child study, development and training may use it for reference. Any lay person who has not attained to the esoteric and exalted mental atmosphere of those for whom the book was primarily intended will have to display unusual enthusiasm and perspicacity to derive enlightenment on the point of reference. The text lacks lucidity and the absence of classifications, schemata and illustrations together with the inordinate length makes its perusal extremely dreary and burdensome.

Congenital Syphilis. By David Nabarro, M.D., F.R.C.P.; 1954. London: Edward Arnold (Publishers), Limited. 9" × 6", pp. 482, with 95 illustrations. Price: 50s.

IN this book the author has gathered together records of a survey of nearly 900 cases of congenital syphilis observed over a period of twenty-three years (to 1939) at the Hospital for Sick Children, Great Ormond Street, London. Behind the work is over thirty years of clinical study by one who was not only director of the clinic, but also hospital bacteriologist.

All conditions likely to be observed in congenital syphilis appear to have been considered and numerous case reports are presented. References at the end of sections and chapters are very numerous and 95 illustrations add to the value of the material presented.

As a rule, it was found that the younger a patient was when he came under treatment, the sooner did the results of serum tests become negative. The most important factor in the prognosis of congenital syphilis was the age at which signs first appeared, the mortality being highest in infancy, being 40% and 70% in different series of cases "before the modern methods of prophylaxis and treatment with penicillin were employed".

In regard to treatment the author does not favour the use of penicillin alone, but recommends the added use of an arsenical and bismuth. Outlines of treatment are given in three body-weight groupings, and procaine penicillin, "Mapharsen" and bismuth make up the schedule in each group. While we think that the use of such combination of antisyphilitic preparations is probably unnecessary, we cannot yet say definitely that it is. Many more years of observation are needed. We consider, however, that so far the use of procaine penicillin preparations, alone, appears to give results at least as good as those obtained by arsenical and bismuth therapy and without the risks attached to their use.

In the preface the author states that "since this book is a historical record of the disease as seen in Britain in the pre-penicillin era many cases have been recorded in considerable detail for future comparison and reference". It is a good thing that we should have such a detailed account of congenital syphilis recorded for posterity by an author of such wide experience and high repute.

The Foundations of Surgery. By George Perkins, M.C., M.Ch., F.R.C.S.; 1954. Edinburgh and London: E. and S. Livingstone, Limited. 7½" × 5", pp. 244. Price: 10s.

THIS is a small book of 230 pages suitable for students in the early stage of surgical training. It is especially written so that a student can readily refer to a certain subject and in a few minutes can become conversant with basic knowledge and sound teaching on that subject. The style and subject matter are both fundamentally simple. Pathological and clinical features as well as methods of examination are included. Illustrations are excluded for economy and the size of the publication allows it to be carried by the student while he is performing his clinical studies in the hospital.

The author has achieved his object of providing help for the student in the introductory period of his surgical studies and the book is well recommended.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"The Clinical Examination of the Nervous System", by G. H. Monrad-Krohn, M.D., F.R.C.P.; Tenth Edition; 1954. London: H. K. Lewis and Company, Limited. 8½" × 6", pp. 448, with 165 illustrations. Price: 36s.

The first edition was published in 1921.

"The Brompton Hospital: The Story of a Great Adventure", by Maurice Davidson, M.A., D.M. (Oxon.), F.R.C.P. (London), and F. G. Rouvray, O.B.E.; 1954. London: Lloyd-Luke (Medical Books), Limited. 10" × 7½", pp. 160, with 31 illustrations. Price: 21s.

The senior author is consulting physician to the hospital.

"Surgical Treatment of Cancer of the Cervix", edited by Joe V. Meigs, M.D.; 1954. New York: Grune and Stratton. 10" × 7", pp. 474, with 150 illustrations, one in colour. Price: $12.00.

The work of twenty-three contributors.

"Myocardial Infarction: Its Clinical Manifestations and Treatment with Anticoagulants: A Study of 1031 Cases", by Irving S. Wright, M.D., Charles D. Marple, M.D., and Dorothy Fahs Beck, Ph.D.; 1954. New York: Grune and Stratton. 10" × 7", pp. 674, with 202 text figures. Price: $8.50.

The book is a report of the Committee on Anticoagulants created by the American Heart Association.

"Three Men: An Experiment in the Biography of Emotion", by Jean Evans, with an introduction by Gordon W. Allport; 1954. London: Victor Gollancz, Limited. 8" × 5½", pp. 316. Price: 20s. 6d.

A novel based on the history of three men.

The Medical Journal of Australia

SATURDAY, JANUARY 15, 1955.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those adopted by the Quarterly Cumulative Index Medicus. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

EVOLUTION TODAY.

ALL living matter has that capacity for variation upon which evolution depends. The development of resistance in any microorganism to the latest antibiotic, in a rabbit to myxomatosis or in a fly to DDT, illustrates this point sufficiently. At the human level, Europeans withstand the exanthemata better than do the people of New Guinea, but these, in turn, suffer less from malaria. Perpetuation of such resistant strains at the expense of their less fortunate fellows is a constant reminder of the reality of evolution by natural selection—survival of the fittest for some particular environment. Conversely, the mechanism may go awry and produce congenital defects of various grades. But this is only another aspect of the one living force—both aspects are of fundamental importance in medicine. The function of the living force is to preserve a condition of homœostasis—a steady state of organization in a world of constant change. Merely to secure this, however, is not evolution. When the mechanism concerned produces better responses in some organisms than others and when, more particularly, it leads to the emergence of progressively more complex organisms, then it is possible to talk of evolution. This does not mean that all adaptive changes are necessarily evolutionary in the progressive sense. Many parasites are highly adapted to their hosts, but often only at the cost of a decided devolution from a more complex to a simpler grade of organization. Also, of course, there are many living groups—for example, among insects—that have remained static practically throughout their known history.

Behind man lie perhaps 1,000,000,000 years of organic struggle for survival, and man commonly considers himself the crown and end of the whole evolutionary process. This may be only because man is, so far as can be discovered, the sole creature able to think and talk about it. Nevertheless, all contemporary living matter, from viruses up, has an equally long life history and, presumably, equal cause for self-congratulation. Of more immediate importance, when a medical man treats his patient he is dealing with the successful product of hundreds of millions of years of struggle for existence, and it is extremely fortunate for both parties that the capacity for such struggle is as potent today as ever it was. Otherwise would the doctor's task be so much the harder and the patient's prospects proportionately worse. Under the circumstances, then, it seems a pity that so little time in the medical curriculum can be devoted to the study of what keeps the mechanism right, and that so much time has to be given to correcting it when it goes wrong. Gradually, perhaps, medical education will evolve; then there may be a shift in emphasis from the present-day reparative outlook—which is a confession of failure—to a more purely biological preventive approach, which offers the only rational prospect for improvement in medicine as a whole. Meanwhile, it does no harm to pause from time to time to survey what is happening in the biological world at large, and the appearance of a recent symposium on evolution[1] affords a convenient opportunity.

As is well known, the end of the nineteenth century saw Darwinism—evolution by natural selection—triumphantly enthroned and, in places, raised almost to the status of a religion. At the same time, some important problems were left unsolved. Nobody could explain the source of the variations upon which natural selection is exercised, and nobody had observed the production of a new species by this process. Darwin's own theory of pangenesis was unwieldy and unconvincing. Actually, the germ of a solution was discovered only seven years after Darwin's "Origin" appeared. In 1866 Gregor Mendel published his now classical researches on the laws of inheritance, but his work was ignored and he died disappointed. His papers did not come to light again until 1900, when De Vries, Correns and Tschermak discovered them independently. The particulate nature of inheritance by individual genes, the reshuffling at each generation and the possibility of additional variation by way of mutation obviously meet the basic requirements for natural selection. The ensuing controversy over whether this was adequate was settled by the championship of Weismann, Bateson and Morgan. Subsequent work by Haldane, Fisher, Dobzansky, Julian Huxley and others indicates that surviving variations introduced by the genetic mechanism will be individually so slight as to give the appearance of smooth gradual change. This "micro-evolution" is in complete harmony with Darwin's views and, mainly under the influence of Julian Huxley and what may be called the "field-naturalist-mathematico-genetic school", it has, in its turn, also been raised to the level of scientific religion. There are dissentients, of course, and Goldschmidt especially maintains that evolution can proceed by major jumps—"macro-evolution"; but of this more later.

The work under review is a typical product of the now orthodox school. In the introduction Huxley restates his highly debatable thesis on the "Uniqueness of Man", while

[1] "Evolution as a Process", edited by Julian Huxley, F.R.S., A. C. Hardy, F.R.S., and E. B. Ford, F.R.S.; 1954. London: George Allen and Unwin, Limited. 9½" x 6½", pp. 394, with 30 text-figures. Price: 25s.

of the other eighteen contributors eleven—Corner, Cott, James Fisher, R. A. Fisher, Ford, Haldane, Lack, Mayr, Sheppard, Southern and Tinbergen—are all strictly conventional and present little that is new. In this section a paper by Goldschmidt would have been welcome, if only as a relief. The remaining seven authors strike a different note—probably because they are reporting from a different front. Rensch and Young are concerned with the nervous system. Rensch's work seems to indicate that while small members of an animal species learn quicker, the larger members retain the lesson longer. Young recounts his well-known work on learning by the octopus; this is mixed up with the rather confused philosophy of his Reith lectures. Zuckerman surveys all the data on the Australopithecinæ and concludes that those creatures were more ape-like than human. The facts appear to support his contention, but there should have been opportunity for Le Gros Clark to give the opposite view. Willmer presents an interesting account of the retinal mechanisms associated with colour vision in various vertebrates, but there is little indication of how they evolved. His paper is marred by the at-present unwarranted assumption of a triple optic pathway to provide a theoretical trichromatic basis for colour vision. Westoll's survey of modern views on the possible correlation between organic evolution and earth movements discloses that some palæontologists, at least, still envisage the rather Cuvierian picture of mass destruction of life at various past geological crises.

That leaves the two most important papers for final consideration. Their importance lies in the fact that they both entertain evolutionary concepts usually ignored by the conventional school. In his article on the origin of the Metazoa, or multicellular organisms, de Beer describes the work of Hadži which suggests that the first Metazoa were not coelenterates as is generally presumed, but were probably members of the flatworm group—Turbellaria Acoela—developed from multinuclear Protozoa by the process variously called neotony, pædomorphism or fœtalization. If subsequent work sustains this view, there will need to be some drastic revision of standard texts. Even more important is a paper by Hardy entitled "Escape from Specialization". Alone of all the contributions in this volume it criticizes the too facile acceptance of the mathematico-genetical concept of evolution by gradual modification. Hardy emphasizes the importance of neoteny as an evolutionary factor. If a major group can arise, not by gradual change in the adult form, but by sudden change at the larval or fœtal stage, a number of interesting possibilities emerge. Most obviously, such larval forms will not be bound by any specializations of the adults, and they may pursue an entirely independent line of development. This disposes of the thesis that specialization inevitably leads to a dead end and seriously weakens one of Huxley's major arguments in support of the "Uniqueness of Man". In addition, the concept of neoteny clearly opens the way for the appearance of major jumps and discontinuities in evolution. Here it is of interest that such major jumps have, in fact, been postulated for at least three crucial phases of animal evolution, and that all three have been attributed to a neotenous process. They are: change from Protozoa to Metazoa (Hadži), change from invertebrates to vertebrates via the Echinodermata (Garstang, de Beer) and the emergence of man (Bolk, de Beer, Abbie). These are all examples of "macro-evolution"—but not necessarily as envisaged by Goldschmidt, although Abbie has shown that, so far as man is concerned, a genetic factor could be invoked. There remains still the even more important problem of the origin of life itself. The ingenious speculations of Oparin, Haldane, Bernal, Pirie and others mark some slight progress here, but their views so far do not appear to fall within the ambit of the mathematico-genetic concept.

All this gives rise to some rather unexpected conclusions. In the first place, if the simplest view is taken of Darwin's "evolution by natural selection", it is evident that, while Nature or heredity supplies the raw materials, it is the environment which selects and preserves the favoured ones. Thus, in the long run, environment is the more potent factor in evolution—definitely "there is a destiny that shapes our ends". Then, while the labours of the "field-naturalist-mathematico-genetic school" have unearthed a great deal of information, they have served on the whole only to confirm Darwin's original views and cannot be considered to have made any major contribution to thought on the subject. Finally, while the Darwinian theory as currently interpreted serves well enough to account for minor evolutionary changes of an adaptive nature, critical changes of major evolutionary importance appear to depend upon the seemingly unrelated process of neoteny. The part played by the environment in securing neotenous change is uncertain, but may prove decisive. Once again, the genetic endowment must supply the raw materials, but the mechanism involved is not so far comprehended by orthodox theory. Evidently, much unorthodox thinking—a completely neotenous approach, indeed—is needed to cope with this problem.

Current Comment.

CORTISONE AND SALICYLATES IN RHEUMATIC FEVER.

SALICYLATES have been the sheet-anchor of the treatment of rheumatic fever for generations, although their mode of action has remained obscure. It seemed possible that they would be supplanted when cortisone and corticotrophin were introduced, but results have been somewhat disappointing, and salicylates remain in the field. Indeed, there seems to be renewed interest in investigating their action and assessing their value. Preliminary results in a long-term study by R. S. Illingworth *et alii*[1] give prominence to the use of large doses. The investigation was a controlled one in which the natural history of rheumatic fever in children receiving salicylates in high dosage was compared with that in children not receiving the drug. The treatment to be given was chosen by random sampling. A total of 55 cases was studied, and the average period of continuous observation was nearly three years. The fall of temperature was significantly quicker in the salicylate group than in the control group. So also was the fall of the erythrocyte sedimentation rate, and the rate reached normal sooner. It was shown that this effect on the erythrocyte sedimentation rate was not due merely to a direct action of the drug on the blood. It was also found that in the control group the fall of the erythrocyte sedimentation rate was significantly quicker in cases of short duration than in those of long duration; in the salicylate group its rate of fall was unrelated to the duration of the attack. Other differences between the

[1] *Quart. J. Med.*, April, 1954.

two groups were not of statistical significance, but the results all gave the impression that members of the salicylate group fared better than those in the control group. Fewer children in the salicylate group developed rheumatic manifestations, such as nodules, while in hospital; fewer suffered relapses; fewer had recurrences of arthritis; fewer developed apical systolic murmurs, and more lost them; fewer had an increase in the intensity of apical systolic murmurs, and more had a decrease in the intensity of these murmurs; more were apparently free from cardiac involvement at the time of the last examination. Illingworth and his colleagues concluded conservatively from this investigation that it provided some evidence that salicylates as they gave them, and in large doses, were of value in the treatment of rheumatic fever. They left unanswered many questions pending further results from a longer period of observation.

Some of these questions were taken up by K. S. Holt, R. S. Illingworth, J. Lorber and J. Rendle-Short[1] in a further study designed partly to determine whether salicylates were more effective in larger doses than in small ones, and partly to compare the effect of (*a*) salicylates given alone and (*b*) salicylates, in large dosage, given with cortisone. They had expected to reach no definite conclusion for at least five years; but the early results obtained from combined use of cortisone and salicylates in high dosage seemed to them so unusual that they have published a preliminary account of their experience in order that others may consider it. In this study, as in the previous one already quoted, the method of treatment was decided by random sampling after rigid diagnostic criteria had been satisfied. Ten children received cortisone with salicylates in large dosage, 10 received salicylates in large dosage without cortisone, and 10 others received salicylates alone in low dosage. The erythrocyte sedimentation rate fell significantly more quickly in the children receiving both cortisone and salicylates than in those of the other two groups. With the combined treatment the average number of days before the erythrocyte sedimentation rate first reached normal was 17·0, compared with 39·2 days in children receiving salicylates in high dosage, and 50·3 days in those receiving salicylates in low dosage. The average duration of treatment in the three groups was 34·0, 79·6 and 67·4 days respectively. The only analysis presented in detail in this paper is that of the erythrocyte sedimentation rate, but it is noted that in all patients receiving the combined treatment there was a very satisfactory and prompt clinical improvement, with a rapid fall of the temperature and clearing of the arthritis and other signs and symptoms other than cardiac murmurs. There was evidence, moreover, that the fall of the erythrocyte sedimentation rate was not merely the result of a direct chemical action on the blood, for it remained lower in the group concerned after the combined treatment was discontinued than in the other groups.

For adequate reasons a group treated with cortisone alone was not included in this study. It will be of considerable interest to see the results when such a group is added to the comparison. In a comparison of aspirin, ACTH and cortisone, H. B. Houser, E. J. Clark and B. L. Stolzer[2] found little difference in their respective effects on patients with acute rheumatic fever apart from more prompt relief of certain acute symptoms by aspirin. Of perhaps greater importance is their conclusion that the over-all effect of each of the three drugs left much to be desired in the treatment of acute rheumatic fever and that adequate therapy for this disease was not at present available. This conclusion may be lined up with the view expressed by Holt and his colleagues that salicylates given alone are probably not the best drug treatment of rheumatic fever. The results so far suggest that the high dosage may be more effective than the low, but no conclusion is reached on this. Moreover, care is taken to avoid the impression that the combined treatment with cortisone and salicylates in large dosage is easy to give or that it is a "cure" for rheumatic fever. Holt[3] in a separate communication has described the toxic complications observed when large doses of salicylates were given and makes clear the difficulties experienced in achieving a high serum salicylate level. He is of the opinion that children suffering from rheumatic fever and receiving high doses of salicylate should be in hospital where close observation is possible. He offers three reasons for this view: (i) frequent adjustments of dose are necessary if therapeutic serum salicylate levels are to be maintained and toxic features avoided; (ii) laboratory facilities are essential for the estimation of serum salicylate levels; (iii) hyperpnœa is a common toxic sign in children, and skilled staff is necessary for its early recognition. The routine use of sodium bicarbonate with salicylate is not considered necessary; but Holt points out that when salicylate is used alone or with cortisone, it should be remembered that toxic effects and excessively high levels often occur without very large doses. Moreover, the development of tinnitus or of deafness is not a reliable sign of salicylate intoxication in a child, because it was found that dangerously high serum salicylate levels were attained without any complaints of those symptoms. It seems that these various new approaches are still essentially experimental and need to be made only with considerable care. However, the results of further controlled studies of the possible synergistic action of cortisone and salicylates will be awaited with great interest.

[1] *Lancet*, December 4, 1954.
[2] *Am. J. Med.*, February, 1954.
[3] *Lancet*, December 11, 1954.

PULMONARY EMBOLISM OR THROMBOSIS?

IN spite of all the recent attention paid to the problem of pulmonary embolism, this is one condition, according to E. Fowler and J. Bollinger,[1] whose recorded incidence and mortality have not been significantly reduced. A. Barnes[2] stated in 1942 that 34,000 persons die annually of this tragic catastrophe; he and Fowler and Bollinger state that this figure is increasing. In their own hospital, deaths due to pulmonary embolism increased from 2·9% during 1930 to 1935 to 5% in 1950 to 1953, a finding which agrees with that of many authorities. Fowler and Bollinger present a clinical study of ninety-seven fatal cases of pulmonary embolism proven at autopsy. These cases occurred in the medical as well as in the surgical wards of their hospital, and, in agreement with other large series, they were found most frequently in the medical wards, where their occurrence was actually four times greater than that in the general surgical wards. The findings in this medical and surgical series reiterate mostly what is already common knowledge of this condition, but a few points of interest may be mentioned.

In this series, the chief condition favouring pulmonary embolism was cardiac disease, especially with a recent change in rhythm, either from normal to fibrillation or the reverse (as after the exhibition of digitalis). Dehydration, whether due to excessive vomiting, or occurring in post-operative conditions or after diuresis following the mercurial diuretics, was another predisposing factor. The sites of formation of the emboli in this series were in the right side of the heart in as many as 39·3% of the cases. In only 47·2% did they originate in the peripheral veins, mainly those of the pelvis and to a lesser extent those of the upper and lower extremities. In 13·5% of cases no note is made as to a site of the primary formation of the embolus. Diagnosis of the occurrence of the pulmonary embolus was correct in only 30% of cases, the catastrophe suggesting cardiac, cerebral, abdominal or pulmonary disease other than embolism, a fact which has caused chagrin to many diagnosticians.

It is obvious that Fowler and Bollinger have never heard of the work of Professor H. R. Dew,[3] of Sydney, or of H. Cummine and R. Lyons[4] working in Dew's Department of Surgery, on the ætiology, pathology, prophylaxis

[1] *Surgery*, September, 1954.
[2] *West. J. Surg.*, 1942, 1: 351.
[3] *Ann. Roy. Coll. Surgeons England*, 1953, 13: 1.
[4] *Brit. J. Surg.*, 1948, 35: 337.

and treatment of so-called pulmonary emboli occurring in the general surgical wards at the Royal Prince Alfred Hospital of Sydney. These workers have shown most importantly that most cases of so-called pulmonary embolism are really examples of primary intravascular pulmonary thrombosis, and Dew's article should be read by both physician and surgeon for its lucid and logical account of why he takes this standpoint. As far as prophylaxis of this condition is concerned, he points out that most sudden deaths from massive pulmonary "emboli" are not unheralded, and indeed the occurrence of the embolus can be foretold by careful observation of the patient in the post-operative period, the finding of a raised pulse rate, a mild pyrexia and a coagulation time below four minutes (estimated by the simple method originated by Cummine). If these factors are present, then immediate anticoagulant therapy will prevent most cases of pulmonary thrombosis. This is at variance with the opening sentence of this comment taken from Fowler and Bollinger's article and is shown by the fact that from 1945 to 1951 in a ward at the Royal Prince Alfred Hospital where 530 patients with prostatic disease were operated on, by either suprapubic prostatectomy or transurethral resection, types of patient notoriously liable to this complication, only three cases of intravascular thrombosis were detected, either clinically or at autopsy. There were two fatal cases, both in patients aged seventy-six years, and a right saphenous thrombosis. To quote Dew: "This method has been used very successfully during the last four years in four large surgical wards with outstanding results. It has lowered the incidence of clinical intravascular thrombosis to a very low figure indeed. The mortality has been reduced to negligible figures and those fatal cases which have occurred have been those where for some reason or other the technique has not been properly followed." And again: "We believe that the use of the above methods in all major abdominal surgical cases could almost lead to the practical abolition of pulmonary intravascular thrombosis as a postoperative problem." It is only fair to state that J. Marks, B. Truscott and S. Withycombe[1] had two deaths from pulmonary embolism whilst the patients were undergoing treatment for venous thrombosis of the legs.

Based on his theory of the pathology of primary intravascular pulmonary thrombosis is Professor Dew's antagonism to the ligation of peripheral veins for its prevention, a dislike shared by many surgeons because, as is shown by Fowler and Bollinger's series, even if one does consider that pulmonary artery thrombi do commence as emboli from peripheral veins, only a small percentage arise in the veins of the extremities. One should, with Dew, regard this disease of intravascular thrombosis as a general blood abnormality to be prevented or treated by the anticoagulants and not by futile local surgical measures.

Professor Dew points out that the correct and prompt use of anticoagulants will enable practically any patient to recover no matter how extensive the thrombosis. This is reinforced by results reported by S. Murray[2] seven years ago when he treated 149 patients suffering from pulmonary embolism (thrombosis) with anticoagulants without a death.

INTESTINAL PERFORATION COMPLICATING MALIGNANT LESIONS OF THE COLON.

A PERICOLIC ABSCESS round a carcinoma of the colon is due to a slow perforation through the growth which gives time for the formation of limiting adhesions by the host. A fairly common finding in that disease, it is due to necrosis of the neoplasm and is not necessarily accompanied by obstruction. Whilst this complication has a poor effect on the ultimate prognosis, it is not immediately lethal. However, acute perforation of the colon in malignant disease of that organ will cause a sudden diffuse peritonitis of a most virulent kind. Two different mechanisms are responsible for this complication. Firstly, when the growth causes obstruction, the distended colon proximal to it perforates. This happens when the ileocaecal valve is competent (said to be in only 40% of patients), so that a closed loop obstruction of colon occurs between the neoplasm and the valve. The caecum is the most vulnerable part, and the rupture usually occurs here, the so-called "diastatic perforation" of Heschl. Secondly, rupture occurs at the site of the actual growth itself. This is due to necrosis often in a massive growth and need not be associated with obstruction.

W. Mersheimer and E. Miller[1] have reviewed 709 patients with carcinoma of the colon and found that acute perforation occurred in 21 instances. In 18 the perforation occurred at the site of the carcinoma, and in only half of these was obstruction present. In three there was a diastatic perforation of the caecum. Consequently, this complication of colonic carcinoma is not uncommon and must be thought of in patients who have a suspicious history of a colonic neoplasm, with or without obstruction, on which is superimposed the clinical picture of rapidly spreading peritonitis, often commencing with severe shock and copious vomiting. Radiographically, air can usually be demonstrated in the abdomen, sometimes in large amount. That the mortality of this complication is extremely high is shown by the fact that 13 of the 16 surgically treated patients of Mersheimer and Miller's series died, whilst all five untreated patients died. The three who recovered were treated by obstruction resection of the tumour.

There is yet another method by which perforation of the colon can occur in these cases. Whilst all surgeons realize that it is very dangerous to give a barium meal to patients with bowel obstruction, it is not quite so well known that enemata, whether therapeutic or opaque for radiological investigation, can be even more dangerous, especially if obstruction is present, because the growth is very friable and œdematous, and an enema can rupture the bowel through or just below the growth. In the above series, it was thought that four perforations were precipitated by a barium enema given within four days of the perforation. In a case recently occurring in an Australian hospital a large carcinoma of the sigmoid colon was perforated by a barium enema and a huge pelvic abscess developed. When opened it was found to be full of barium, pus, fæces and gas. This patient recovered with drainage of the abscess, removal of the barium, and excision of the growth by the method of Mikulicz-Paul. Therapeutic enemata, given to relieve constipation or obstruction, may rupture the growth, especially when given by unskilled persons. The results of such perforations are lethal enough if saline is used for the enema, but there is still a chance of recovery if the fæces and fluid are removed from the peritoneal cavity and the growth dealt with *secundum artem*. However, if soap is used in the enema then a soap-gangrenous peritonitis develops with death in a few hours, no matter what treatment is given. This is yet another reason why soap should never be used in any enema. It is totally unnecessary and highly dangerous.

[1] *Lancet*, 1954, 2: 787.
[2] *Surg., Gynec. & Obst.*, 1947, 84: 665.

THE HISTORY OF ST. MARY'S HOSPITAL MEDICAL SCHOOL.

IN England during the eighteenth century the education and training of the medical student for general practice was an entirely haphazard affair; and there seemed to be little public or professional interest in the matter. The Royal Colleges were either indifferent or openly obstructive to medical reform, so long as the city of London was adequately supplied with specialist physicians and surgeons. However, the *Apothecaries' Act* of 1815 proved a disturbing element in medical circles as the first legislative step to recognize the need for a duly qualified general practitioner.

[1] *Surg., Gynec. & Obst.*, October, 1954.

The continuation of the story of medical reform in England is frequently recalled in "The History of St. Mary's Hospital Medical School", which Sir Zachary Cope has recorded[1] to commemorate the centenary of the simultaneous and, therefore, unique foundation of a public hospital and its attached medical school in 1854. The author of this handsome volume has had a close connexion with the combined institution for over half a century, having joined the school as a medical student in 1900, to become later a distinguished surgical specialist on the staff of the public hospital which he served for thirty-five years. The earlier chapters reveal the general acceptance of a more enlightened attitude to the education and professional welfare of medical students, and interesting details are related of the peculiar circumstances which led up to the establishment of the new hospital and school of medicine. Throughout the book are freely scattered the names of many people who have been associated with the institution, and whose names have become famous in the annals of medicine: Lord Moran, Sir Almroth Wright, Sir Alexander Fleming, Sir John Burdon-Sanderson, Sir Leonard Rogers, Henry Maudsley, Sir Bernard Spilsbury, Professor G. W. Pickering, Dr. A. D. Waller, who had a share in the development of electrocardiography (1887), and Dr. Ernest Hart, a noted editor of the *British Medical Journal* from 1866 to 1898.

All the medical historians will be grateful to Sir Zachary Cope. They will appreciate the final section of the book which contains many short biographical sketches, and also the many portraits and illustrations.

THE OPTIMAL DOSE OF MORPHINE.

MOST practising doctors, especially surgeons, will probably be prepared to assert that if experience had taught them nothing else, at least they know how to use morphine in appropriate dosage. However, second thoughts on the subject may be appropriate in the light of a recent study carried out by Louis Lasagna and Henry K. Beecher[2] on the optimal dose of morphine. These investigators define the optimal dose of the drug as that dose which provides the desired therapeutic effects with a minimum of undesirable side effects. They give four important reasons why the optimal dose of morphine should be carefully defined. First, it is usually employed in the treatment of acute pain when there is a premium on rapid and effective relief and little opportunity for leisurely trial and error. Second, morphine can produce unpleasant and even dangerous side effects, so that the flexibility in dosage is not as great as is permissible with a drug such as penicillin. Third, in relation to the risk of addiction, the view has been expressed that the use of minimal effective doses of morphine reduces the incidence of euphoria, and evidence has been presented that the development of physical dependance is directly related to the size of the dose administered. Fourth, it is customary for investigators to compare old and new analgesics with morphine as the standard of reference; the optimal dose of morphine is particularly appropriate as such a standard. Using a technique of comparison, the refinements of which have been worked out carefully over some years, Lasagna and Beecher studied the relief of pain in 122 patients after operation. They paid separate attention to the incidence of pain relief, the duration of pain relief and toxic effects. They found that only slight increase in potency and duration of analgesia of morphine occurred when the dose was raised from ten to fifteen milligrammes (that is, from one-sixth to one-quarter of a grain). The side action liability and respiratory effects of these two doses were studied in ten healthy volunteers. Amongst these a trend was observed towards greater respiratory depression with the larger dose, and a significantly higher incidence of troublesome side effects was recorded. From a review of the literature, Lasagna and Beecher produce evidence that 15 milligrammes (that is, one-quarter of a grain) doses of morphine are probably unnecessary to relieve pain in the majority of patients receiving this drug and are apparently more productive of undesirable side effects than doses of eight to ten milligrammes (one-eighth to one-sixth of a grain). In view of these findings, careful consideration should be given to the conclusion of Lasagna and Beecher that the routine use of doses of fifteen milligrammes (one-quarter of a grain) seems unwarranted. The optimal dose appears to be ten milligrammes (one-sixth of a grain) per 70 kilograms of body weight.

[1] "The History of St. Mary's Hospital Medical School or A Century of Medical Education", by Zachary Cope; 1954. London: William Heinemann (Medical Books), Limited. 9" × 6", pp. 268, with 26 illustrations. Price: 25s.

[2] *J.A.M.A.*, September 18, 1954.

NEUROLOGICAL COMPLICATIONS OF RUBELLA.

RUBELLA is usually a mild and uncomplicated disease. Major complications may, however, occur. Best known are the developmental abnormalities caused in the fœtus by maternal infection with rubella during the first trimester of pregnancy. Less known, but common enough in particular epidemics, is involvement of the patient's central nervous system, sometimes with a fatal outcome. William Mitchell and G. Pampiglione,[1] after a survey of published reports of this type of complication, state that the onset is usually three or four days after the appearance of the rash. The patient then complains of headache, apathy and a stiff neck; less often he has nausea and vomiting. Coma often follows in a few hours and may persist for from a few hours to three days. If the patient does not die at this stage, he can be expected to recover gradually in a few weeks. In some cases the central nervous complications have preceded the rash by two to nine days, and in one case the rash recurred after the onset of neurological complications. A slight increase in protein content and a large increase in the number of cells are usually found in the cerebro-spinal fluid. No specific post-mortem features have been recorded. Mitchell and Pampiglione report the case of a middle-aged man, who presumably caught rubella from his children, who had it in the usual mild form. On the fourth day of the clinical course of the disease the patient became semi-comatose. Then followed a variety of nervous and mental effects; gross mental disturbance lasted for two months in severe form and gradually cleared up in six months. The clinical and electroencephalographic record indicates that the rubella severely affected the patient's brain stem and spinal cord, and probably his frontal lobes. Mitchell and Pampiglione point out that, except in toxic or metabolic psychoses, it is uncommon for complete recovery to follow such a widespread lesion of the central nervous system. The fact that recovery occurred in this case is consistent with the view that the anatomical changes apparently associated with the neurological complications of rubella are largely reversible in weeks or months.

THEFTS OF DRUGS FROM DOCTORS' MOTOR-CARS.

SERIOUS CONCERN has been expressed by the authorities responsible for the administration of the drug laws in relation to the number of incidents which have occurred during recent months of the theft of drugs from unattended motor vehicles. Apart from more obvious considerations which dictate care in this matter, attention is drawn to the fact that doctors and other authorized persons have a definite responsibility under the drug laws to safeguard dangerous drugs under their control. The Chief Secretary's Department in New South Wales has now issued a warning that drugs are not to be left in motor vehicles under any circumstances. Any person who fails in his responsibilities under the drug laws in this manner renders himself liable to prosecution.

[1] *Lancet*, December 18, 1954.

Abstracts from Medical Literature.

PÆDIATRICS.

Immunization of Infants with Triple Antigen.

G. V. FELDMAN (*Arch. Dis. Childhood*, June, 1954) has made a study of the efficacy of immunization of infants of three months against diphtheria, whooping-cough and tetanus using a combined antigen. He states that an aluminium-adsorbed antigen was used, for there is evidence that it is more effective in young infants that is an unadsorbed prophylactic agent. The study includes 200 infants. Those with a family history of epilepsy or convulsions in infancy were excluded. The first injection was 0·5 millilitre, the second 0·75 millilitre one month later and the third 1·0 millilitre four to five months after the second. The antigen was given by deep intramuscular injection into alternate buttocks. After the antigen was drawn up into the syringe a fresh needle was used to minimize the risk of the material entering the subcutaneous tissues and causing abscess formation. Local œdema and erythema lasting two to three days was common. A sterile abscess formed once, but was cured by a single aspiration. Fretfulness and occasional vomiting and drowsiness occurred. One month after the third injection the antibody titre of the blood was examined in 35 infants. In all there was a satisfactory level of tetanus and diphtheria antitoxin, and in 33 a satisfactory level of pertussis agglutinins. Some children produced higher titres against pertussis than against tetanus and diphtheria, and *vice versa*. It seems that the individual antigenic response to the three components is an independent phenomenon and may vary with each child. There is no evidence that any one component interferes with the activity of the others.

Anæmia in Malnourished Children.

F. GOMEZ, J. SANTAELLA, R. GALVAN, J. CRAVIOTO AND S. FRENK (*Am. J. Dis. Child.*, June, 1954) studied the nature of the anæmia present in a group of 51 malnourished children in Mexico. They had been impressed by the fact that the anæmia was most often normochromic and normocytic and responded poorly to the usual hæmatinics. They demonstrated an increase in blood volume, and concluded that this was an important factor in producing the apparent anæmia. The children showed a moderate to marked degree of malnutrition. The majority showed evidence of pellagra in the skin, and more than half had some œdema.

End-to-End Aseptic Intestinal Anastomosis in Infants and Children.

ORVAR SWENSON (*Surgery*, August, 1954) describes the technique of an end-to-end aseptic anastomosis of intestine in 32 infants and children. Seven operations were performed for closure of ileostomy or colostomy, five for irreducible intussusceptions, four for atresia of the small intestine, three for congenital bands with intestinal obstruction and perforation, two for strictures of the small intestine, two for Meckel's diverticulum with adjacent pathological changes requiring resection and one for diverticulum of the colon. The pre-operative management of these patients was normal with intravenous administration of fluids and blood and intestinal intubation. Six to eight inches of the widely dilated intestine proximal to the atresia were resected, and the intestine proximal to the obstruction was decompressed by means of an aseptic aspirator which the author described in 1940. Clear illustrations give details of the technique, which requires only small hæmostats and fine silk on atraumatic needles. In this series three post-operative deaths occurred.

Congenital Hydrocephalus.

J. W. MILLEN, D. H. M. WOOLLAM AND G. L. LAMMING (*Lancet*, October 2, 1954) have investigated congenital hydrocephalus in late fœtal and stillborn offspring of female rabbits subjected to prolonged vitamin *A* deficiency before mating and during pregnancy. They state that the primary cause of this hydrocephalus has not yet been determined, but the evidence suggests that the determining factor may be an overproduction of cerebro-spinal fluid, combined with a relative insufficiency of the cerebral aqueduct. The observations are discussed in relation to the production of congenital abnormalities by vitamin dietary deficiencies and to current views on the ætiology of hydrocephalus. The authors state that the results of the experiments reported confirm earlier observations of hydrocephalus in young rabbits from does deficient in vitamin *A* and show that it is possible for the hydrocephalus to be already established at birth. This finding raises many questions about both the ætiology of congenital forms of hydrocephalus in man and the factors influencing the development of abnormalities in general.

Mongolism.

L. S. PENROSE (*Lancet*, September 11, 1954) surveys the known facts about the genetics of mongolism. He states that the familial incidence is low, but a tendency seems demonstrable for some mothers to be predisposed to have affected offspring. Some predisposed mothers, though perfectly normal and healthy, may show slight signs of "mongoloid" traits. In so far as hereditary differences between different children are part causes, they must depend upon common genes, possibly of several alternative kinds. Some of these genes may be the same as those which influence predisposition in the mother. Abnormal cytoplasm is not likely to be the sole cause, nor is fresh mutation considered a probable explanation. The author considers that the precipitating environmental influences, which may be nutritional or hormonal, require intensive investigation.

ORTHOPÆDIC SURGERY.

The Anatomy of Hallux Valgus.

R. WHEELER HAINES (*J. Bone & Joint Surg.*, May, 1954) reviews literature and descriptions of anatomical preparations, observations at operation and radiographs in comparing with the normal the anatomy of the forefoot in *hallux valgus*. He states that the early and essential lesions are stretching of the ligaments on the medial side of the metatarso-phalangeal joint that attach the medial sesamoid and basal phalanx to the metatarsal, and erosion of the ridge that separates the grooves for the sesamoids on the metatarsal head. In cases of established *hallux valgus* a sagittal groove, formed where the cartilage is free from pressure by either the phalanx or the ligaments, cuts off a medial eminence, which articulates with the stretched ligaments, from a restricted area for the phalanx. Apart from osteophytic lipping, which squares off the outline of the eminence as it is seen in radiographs, and a small amount of lipping of the ridge on the metatarsal, there is no evidence of new bone growth. In chronic cases the eminence may degenerate or disappear. The articular surfaces at the cuneo-metatarsal joint become adapted to the changed positions of the metatarsal without gross pathological change. The four deep transverse ligaments that bind together the five plantar pads of the metatarso-phalangeal joints are not unduly stretched; so that as the metatarsals spread, it is the ligaments that bind the pads to the heads of the metatarsals that give way. The plantar metatarsal artery to the first space pursues a tortuous course between the two heads of the *flexor hallucis brevis*. In cases of *hallux valgus* the course becomes still more tortuous, and part of the pain experienced may be due to ischæmic effects.

The Evolution of Lateral Rhachotomy.

NORMAN CAPENER (*J. Bone & Joint Surg.*, May, 1954) believes that in lateral rhachotomy we have a procedure which is appropriate for approach to the vertebral bodies in a variety of pathological processes including, besides the relief of Pott's paraplegia, the treatment of non-paraplegic tuberculosis, the exploration of spinal tumours, the relief of certain types of traumatic paraplegia and the drainage of suppurative osteitis of the vertebral bodies. In tuberculous disease lateral rhachotomy is a technical procedure which provides a meeting point for the solution of several ideas. These are the evacuation of tuberculous abscesses as enunciated by Pott and developed by Menard, the revascularization of avascular areas, the removal of necrotic material and the direct removal of the features causing spinal cord compression. The author states that Pott's paraplegia most commonly results from disease in the thoracic region, and it seems clear that this is related to the more malign nature of the disease in this part of the spine, one of the peculiar features of which is the associated pneumodynamic effects within the thorax. The pumping action of

respiration upon the paravertebral abscess (which is so apparent when an abscess is opened in the course of lateral rhachotomy) possibly plays some part in aggravating the process of avascularity which is such a common feature of spinal tuberculosis. Such avascularity is insufficiently recognized and, quite apart from its relation to the subject of paraplegia, its consideration is of significance in supporting Wilkinson in his advocacy of lateral rhachotomy for subjects of non-paraplegic spinal tuberculosis not responding adequately to more conservative procedures.

Injuries of the Atlas and Axis.

B. J. S. GROGONO (*J. Bone & Joint Surg.*, August, 1954) states that injuries to the atlas and axis may occur at any age. They are usually not fatal. In children spontaneous rotatory dislocation is the commonest type of lesion. In adults fracture of the odontoid process is more likely. The spinal cord is often undamaged. In some cases complicated by cord damage the neurological disturbance is caused by an associated injury to the lower cervical part of the spine. Spinal cord damage may be immediate or delayed. In cases of incomplete cord lesion there may be recovery of function after reduction of the displacement or without such reduction. Diagnosis rests on the history and physical signs, and on radiographic findings. Radiographs of this area require careful interpretation, and special radiographic techniques may be necessary. A normal radiograph does not necessarily exclude the possibility of atlanto-axial injury. The author believes that though many patients would survive without treatment, the initial discomfort and danger of complications demand that adequate protection be provided. In relatively minor injuries and in old people protection by a plaster collar may be sufficient. In some cases it is justifiable to undertake manipulation and to apply a plaster. Patients with severe displacement require traction, preferably by skull calipers. Recurrent displacement, instability and cord signs demand operative reduction and fusion. Satisfactory fusion of the atlas and axis alone is feasible, and good function is preserved. More extensive fusion of the cervical part of the spine is seldom necessary.

The Use of the Acrylic Head Prosthesis in High Fractures of the Femoral Neck.

J. C. F. CREGAN (*J. Bone & Joint Surg.*, August, 1954) reviews the management and progress of 65 patients with high fracture of the femoral neck treated by excision of the head and replacement by an acrylic head prosthesis. The behaviour of the reconstructed hip joints has been studied during the second, the third and, in a few cases, the fourth years after operation, and found to follow a definite general pattern. All patients operated on were over sixty years of age, and three-quarters of them were over sixty-five years, the oldest being aged ninety-three years. Many were poor subjects for operation, with cardiovascular disease, mild urinary sepsis and chronic bronchitis; but if their condition was not rapidly deteriorating, this risk was accepted. Patients with fractures mainly lateral to the mid-point of the neck have been treated by Smith-Petersen nailing, provided that the fractures were reducible; so this series contains only medial fractures and irreducible lateral fractures. Twelve of the patients were operated on from one to six months after the fracture, either because of late diagnosis or because of failure of a nailing operation. In all other cases the operation was carried out within ten days of the injury. The term "irreducible" is used for fractures in which, after manipulation, uncontrollable rotation of the head is found to have occurred, preventing accurate coaptation of the fractured surfaces. The author found that, in general, in fresh fractures treated by immediate operation, the clinical results have been as follows. During the first year the hip has been comfortable for weight-bearing, and the range of movement has, by the fourth month, reached at least two-thirds of the normal in all directions. The patient has usually used one stick outside, discarding it in the house, and walking with a slight limp but with little or no pain. During the second year some minor complaints have been the rule, such as aching in the hip or a disinclination to go shopping or to climb stairs in the house. During the third year 85% of the patients stated that the hip was painful to a greater or less degree. The limp increased, and movement diminished to a variable extent. The author concludes that, in general, the long-term clinical results of prosthetic arthroplasty after fresh fractures have been disappointing. The method has given slightly better results in the treatment of old fractures. In view of the almost perfect results obtained after successful Smith-Petersen nailing in the presence of an adequate blood supply to the femoral head, it seems unjustifiable to abandon this principle for immediate substitution with an acrylic femoral head. Nevertheless it is believed that an arthroplasty of this type is justified for fractures treated late, and in fresh subcapital fractures when the fracture is irreducible. If a prosthesis is to be used, more protection for the stump of the neck against the strain of weight-bearing is essential; a simple head prosthesis is inadequate, and a head with either a neck extension or an intramedullary prolongation may give better results.

Adamantinoma (So-called) of the Long Bones.

PERREN L. BAKER, MALCOLM B. DOCKERTY AND MARK B. COVENTRY (*J. Bone & Joint Surg., July, 1954*) have studied 27 cases of adamantinoma (so-called). Of these 24 were encountered in a review of the literature, whilst the other three consisted of new cases reported in detail in this paper. In this series the age of the patients ranged from twelve to fifty-seven years. The tumour involved the tibia in 24 cases, the femur in one, the ulna in one and the fibula in one. Pain was the principal symptom. A mass and swelling were present in a few cases. Fibrous dysplasia coexisted in five cases. The authors state that extracranial adamantinoma is a slow-growing epithelial tumour which occurs in bone. The origin of the epithelial tissue is unknown. No agreement has been reached whether the epithelial tumour is a basal-cell or a squamous-cell carcinoma. Microscopically, variations may include the following patterns: basal cells, adenocystic basal cells, squamous cells and an ameloblastic or a sarcomatoid pattern. The treatment of choice is amputation, preferably through the proximal bone. This opinion is based on the fact that the tumour is almost certain to recur. In 17 of the 27 cases in this series, recurrence is known to have taken place, followed by death in eight instances. Metastasis was proved by biopsy in four cases, a fact further emphasizing the necessity for radical surgical treatment.

Muscle-Pedicle Bone Grafts.

JOEL HARTLEY AND NORMAN SILVER (*J. Bone & Joint Surg.*, July, 1954) found that a muscle pedicle permitted to remain attached to autogenous bone grafts in rabbits was effective in retaining viability of the contiguous bone. The deeper areas of pedicled bone grafts, remote from the muscle pedicles, did not remain viable. Fractures through the experimental bone grafts with muscle pedicles showed evidence of reparative osteogenesis in the region of the viable bone. Control experiments without muscle pedicles revealed necrosis of the bone grafts. Fractures of the control bone grafts showed no evidence of reparative osteogenesis.

Trapping of Soft Tissue in Severe Ankle Joint Fractures.

RALPH W. COONRAD AND EVERETT BUGG (*J. Bone & Joint Surg.*, July, 1954) describe two cases of trapping of the posterior tibial tendon, in one of which there was associated trapping of the posterior tibial nerve, and two cases with interposition of a reflected portion of deltoid ligament within the medial aspect of the joint space, presented as complications of severe fracture-dislocation of the ankle joint, requiring open reduction. The authors believe that failure to achieve anatomical reduction in fractures about the ankle is probably the largest cause of poor end results. It is suggested that any patient with fracture dislocation of the ankle in which there is severe medial ligamentous injury and disruption of the mortise, which cannot be reduced by initial closed manipulation, should be considered a candidate for early open surgical reduction. True antero-posterior skiagrams of the ankle joint are necessary for any critical evaluation of mortise alignment. Closed reduction is usually satisfactory, but "almost satisfactory reduction" should not be accepted. The authors point out that, if necessary, surgical reduction should be carried out while the fracture is still fresh, before superficial skin necrosis, œdema and other vascular manifestations occur. The authors suggest that open reduction is in addition usually necessary in patients in whom the fibular fragment is caught behind the postero-lateral ridge of the tibia, and also when soft tissue structures may be trapped within the ankle or between fragments of bone.

XUM

Medical Societies.

PÆDIATRIC SOCIETY OF VICTORIA.

A MEETING of the Pædiatric Society of Victoria was held on August 11, 1954, at Fairfield Hospital, Fairfield.

Herpes Simplex Infections.

DR. J. COLEBATCH discussed the clinical features of *herpes simplex* viræmia in the newborn. He outlined the clinical features of generalized inclusion disease of the newborn, which was first described fifty years ago, and compared those features with the similar clinical picture recently described as being due to *herpes simplex* virsemia, a patient suffering from which had been under his care. He then gave a brief account of the clinical features of six babies who appeared to have suffered from severe infection in the early neonatal period, with symptoms resembling those of both generalized inclusion disease and *herpes simplex* viræmia. Five of the babies had died, three of them with gross hæmorrhagic manifestations. The sixth had had severe purpura in the first days of life, was *in extremis* for several days and then slowly recovered, but when subsequently followed up was found to be mentally retarded. In four of the five fatal cases inclusion bodies had been found by pathologists in one or more viscera. Retrospectively it was not possible to establish whether the babies had in fact suffered from *herpes simplex* viræmia or from what had been known as generalized inclusion disease. Dr. Colebatch then gave the full clinical story of the seventh patient. The baby had become ill on the sixth day of life, and had deteriorated rapidly after the ninth day, with gross hæmorrhagic manifestations and thrombocytopenia, death occurring on the eleventh day. A generalized virus disease had been suspected on clinical grounds, and at autopsy Dr. Alan Williams and Mr. Ian Jack had left no stone unturned to show that the child had suffered from *herpes simplex* viræmia.[1]

MR. I. JACK discussed further points in the laboratory diagnosis of *herpes simplex* virus infection in the light of two years' work on the subject at the Royal Children's Hospital. He said that the methods available for laboratory diagnosis of *herpes simplex* infections were well exemplified by the approach to the case of neonatal hepatic necrosis which had been described in the paper by Dr. Williams and himself. The rather detailed approach to the identification of the agent was not normal practice, but was considered warranted in this case, the first Australian and the fourth world case in which histological diagnosis had been confirmed by isolation of the virus.

Mr. Jack referred to certain other aspects of the case, and to the findings in cases of aphthous stomatitis, *eczema herpeticum*, and encephalitis of unusual type. Other points of interest in relation to the case under discussion were the possibility of viræmia and the serological findings in the mother. Plain blood was not obtained during life or at necropsy; but heavily blood-stained heart muscle was found to contain copious amounts of the virus. The tissue showed no histological evidence of infection with *herpes simplex*. It was possible that the virus was present in the blood. In the mother a history of recent "influenza-like illness" seemed confirmed by demonstration of influenza B complement-fixing antibodies in serum taken three days after the death of the child. Influenza B was at that time epidemic in Melbourne. That same specimen of serum, and another taken three weeks later, did not contain herpes complement-fixing antibodies. Those findings appeared to indicate that the mother had never had contact with *herpes simplex*, that she did not develop a concurrent infection with the child's virus, and that she did not infect the child. Dr. Colebatch had later found that two nurses suffered from cold sores during the infant's stay in the labour ward. Mr. Jack said that the case illustrated the potential danger of primary or recurrent herpes infection in late pregnancy. The onset of cold sores in maternity staff, or the recurrence of any form of herpes in a mother, should serve as a warning signal.

Commenting on the general diagnosis of herpes infection, Mr. Jack said that the usual technique employed in the laboratory diagnosis of *herpes simplex* was not so elaborate as that used in the case of neonatal hepatitis mentioned previously. Briefly the plan was threefold: (i) isolation in eggs of a pock-producing virus; (ii) serological identification of any virus isolated in the eggs; (iii) study of the patient's immune response. However, two points of qualification were required. Firstly, the failure to isolate virus could not be taken as evidence of its absence, the time at which the specimen was collected and the technique of collection being important variables. Secondly, serological findings had to be interpreted in the light of the fact that herpes virus infections were of two grades—primary infection (often severe and generalized), and the so-called "secondary" infection, for which the name "non-primary" herpes infection was preferred. They were usually mild and localized. The primary infection was characterized by the absence of antibodies in the "acute" serum, and with their presence in "convalescent" serum. Once formed, they seemed to persist at recognizable levels, as was shown by the fact that approximately 80% of the population had antibodies. Workers at the Walter and Eliza Hall Institute of Medical Research had obtained those results with the neutralizing antibody, and Holzel in 1953 had investigated the complement-fixing antibody. Thus, in the evaluation of serological findings in cases of *herpes simplex* viræmia infection, the date of onset of the illness, the past history and two serum samples should be available.

Mr. Jack went on to say that some of the varying serological findings and their interpretations could be seen in some cases of stomatitis, *eczema herpeticum* and encephalitis, which he would discuss. Some 10 cases of stomatitis had been investigated and four definite diagnoses made. There were four successful isolations of virus in children aged between three and eight years. Serological investigation indicated that three of the infections were primary. The fourth was a non-primary infection, since sera taken at three and thirty-four days after both gave positive findings. Two of the four patients were admitted to hospital after upper respiratory tract infections. Six cases of *eczema herpeticum* (Kaposi's varicelliform eruption) had been seen, the patients being infants aged from five to twenty months who had suffered from infantile eczema for periods of four to eighteen months. There were no fatal cases. The virus was isolated in four cases, and in two of them serological evidence of primary infection was found. It was not possible to investigate the other two cases serologically. Virus was not isolated in the other two cases, but they gave serological evidence of primary infection. One of the patients did not develop antibody until between fifteen and thirty-seven days. That would seem to indicate that it was unwise to make a negative diagnosis unless late convalescent serum was available. Simms and French in 1948, at the Adelaide Children's Hospital, had reported several cases of *eczema herpeticum*, and had given warning of the dangers of having such patients in a dermatological ward. That had been borne out by experience with two of the present series. The second case occurred in an eczematous child convalescent from *otitis media*, and unfortunately in the same ward as the first patient.

Mr. Jack went on to say that some 20 out of 100 patients with encephalitis had been found to have herpes complement-fixing antibodies; but the presence of the antibodies at the date of onset, and their failure to rise, ruled out herpetic encephalitis. However, two cases were obviously different from the majority; they were cases of severe encephalitis, and both patients had resultant central nervous system damage. The first child, aged seven months, was examined at the fourteenth day, when she had been comatose for two days, during which time she had developed a weeping eruption on the face, having previously had a vesicular eruption on the extremities. Serum taken at fourteen and thirty-nine days was found to have complement-fixing antibody titres of 0 and 96 respectively. That was indicative of primary infection with *herpes simplex* virus. In the light of accepted standards, the lack of antibody at fourteen days tended to suggest that herpes was not the cause of the fourteen-day illness—the encephalitis. On the other hand, antibody might fail to appear by the customary ten days. The second child was aged thirteen months. Serum taken at seven and thirty-three days had *herpes simplex* antibody titres of 128 on each occasion. There was no history of herpes. The titres, though not rising, were extremely high. The average titre found in the laboratory in positive cases of herpes antibody was 20. Slight differences in complement-fixing technique led to wide differences in titres, so that it became necessary to evaluate those high titres with respect to those usually obtained under identical conditions. That case was therefore of unusual interest, for the high titres suggested recent infection with herpes. In the absence of manifest history it was assumed that a recent unrecognized infection had occurred, and had possibly led to post-infectious encephalitis.

Mr. Jack said that the various cases indicated the increasing interest shown at the Royal Children's Hospital in

[1] The paper by Dr. Alan Williams and Mr. Ian Jack will be published in a later issue of the journal.

herpetic infections, and he hoped that his remarks had indicated the relative simplicity of diagnosis of the widespread clinical entities due to that virus. The diagnostic services of the laboratory were available to all pædiatricians desirous of confirmation of clinical diagnosis.

DR. G. ANDERSON opened the discussion by showing some figures with which Mr. J. White, B.Sc., of Fairfield Epidemiological Research Unit, had provided him. The figures showed that the antibody titre rise in the acute primary attack of *herpes simplex* was from less than 5 to 30. In nurses with cold sores the rise was less than 5 to 10 with a range up to 80. In central nervous system disorders the range was much the same. In recurrent herpes he thought antibody levels were of no significance, because there was a big variation in normal people. In cases of encephalitis at Fairfield there had been no evidence of herpetic ætiology.

SIR MACFARLANE BURNET said that he had been impressed by Mr. Jack's remark that two nurses in the baby ward had had cold sores. Epidemiological studies between 1939 and 1947 had shown that the prevalence of early herpes had been falling in the community, and that more children were being born without antibodies to herpes, just as was happening with poliomyelitis. Therefore cases such as those described at the meeting might become more frequent. He thought that the whole question of the significance of virus infection in the newborn was important. It was possible that a virus which produced only an unimportant symptom might in the non-immune infant produce fatal results. It would be beneficial to further studies if pathologists dealing with infant deaths kept at the post-mortem table a small jar of saline and penicillin, into which a small piece of the diseased tissue, especially liver, could be dropped and then kept in the deep freeze for future examination. He thought some interesting results would be obtained in otherwise unexplained deaths, particularly in relation to generalized inclusion body disease. No adequate studies on human inclusion disease had been carried out so far.

DR. KATE CAMPBELL asked whether there was any evidence that herpes virus produced a real viræmia in the mother, and whether transplacental transmission was possible or whether the disease was transmitted after birth. She had sometimes seen a newborn baby covered with pocks, and in one case the mother had recurrent herpes about the mouth. She asked what was the incubation period of virus encephalitis, and whether it could be transmitted through the placenta.

Mr. Jack replied that there was no knowledge of adult viræmia, although American workers had suggested it.

Dr. Colebatch, in reply to Dr. Campbell, said that there was no recorded case of transplacental infection with herpes, but one recorded case of infection occurring on the first day. Zuelzer had said that the incubation period was two to five days. In all Dr. Colebatch's cases the disease had started on the sixth day.

DR. ELSIE ABRAHAMS said that the patient from the Queen Victoria Memorial Hospital had been one of twins. One twin had died on the second day of life, but there had been no evidence of the disease. The other had died on the ninth day of life with herpes.

Tissue Culture Techniques in the Diagnosis of Poliomyelitis.

DR. A. FERRIS then described the application of tissue culture techniques to the clinical diagnosis of poliomyelitis. He said that studies of poliomyelitis virus in tissue culture at the Commonwealth Serum Laboratories in Melbourne had provided much useful information on the epidemiology of poliomyelitis in Victoria. At Fairfield Hospital they had worked in close collaboration with Commonwealth Serum Laboratories, but it had not been practicable to explore the diagnostic possibilities of the tissue culture method. For that purpose a suitably equipped laboratory at the hospital was essential, and such a laboratory had just been established at Fairfield. They used human embryonic tissue with Enders's beef amniotic fluid as medium, and were trying to examine fæcal specimens and "paired sera" from all patients admitted to hospital as possibly suffering from poliomyelitis. Diagnosis based on a rising antibody titre had been difficult to establish, because appreciable antibody might be present quite early in the illness. The mere presence of antibody in a single serum specimen was of no significance, because so much subclinical infection occurred, and there was no means of relating the presence of such antibody to a current illness. It was possible, for epidemiological purposes, to test serum from a group of paralytic poliomyelitis patients and infer the epidemic virus strain from an examination of the findings. The best diagnostic

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED DECEMBER 18, 1954.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	4(2)	1(1)	6(2)	..	..	..	..	..	11
Amœbiasis	..	..	1	..	..	..	..	..	1
Ancylostomiasis	..	..	..	..	..	..	..	..	..
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	2(1)	..	..	1	..	..	..	3
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	2(2)	..	..	..	..	..	..	2
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	3(3)	8(8)	9(9)	3	3(2)	..	..	2	28
Diphtheria	3(2)	2(2)	2(1)	1(1)	2(2)	..	..	..	10
Dysentery (Bacillary)	..	..	11(10)	..	1(1)	..	..	..	12
Encephalitis	..	2(2)	..	..	..	..	..	..	2
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	1	..	..	1
Infective Hepatitis	76(46)	81(62)	..	..	5(1)	..	..	4	166
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	1	..	1
Leptospirosis	..	..	2	..	..	..	..	..	2
Malaria	..	..	..	..	..	..	..	..	..
Meningococcal Infection	3(1)	5(5)	1	..	..	2	..	..	11
Ophthalmia	..	..	..	..	..	..	..	..	..
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	4	13(12)	8(1)	2	..	3(1)	..	..	30
Puerperal Fever	..	1	..	..	1	..	..	..	2
Rubella	..	27(23)	..	..	14(13)	..	..	1	42
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	21(12)	35(22)	5(1)	6(3)	..	1(1)	..	..	68
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	..	..	..	..	..	..	..
Trachoma	..	..	..	..	41(1)	..	..	..	41
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	21(15)	32(25)	21(4)	3(1)	9(5)	5(2)	2	..	93
Typhoid Fever	..	..	..	..	..	..	..	..	..
Typhus (Flea-, Mite- and Tick-borne)	..	..	2	..	..	..	..	..	2
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

evidence in poliomyelitis, as in other infectious diseases such as typhoid fever and diphtheria, was afforded by demonstration of the causal microorganism. In almost 50% of the cases in which they had isolated virus to date, the result had had some diagnostic significance, and in infections in young babies in whom paresis was difficult to assess, a positive laboratory finding was most helpful. They were unable as yet to state the significance attached to failure to isolate virus, but believed that their isolation rate was about 50% for combined paralytic and non-paralytic infections.

DR. H. MCLORINAN, in opening the discussion, said that he had always been rather annoyed by talk of atypical poliomyelitis. Until there was a method of precise laboratory diagnosis, even the diagnosis of paralytic poliomyelitis was still a guessing game. He was glad to see the cultural method introduced into Melbourne. Tissue culture methods were available in three States now.

Sir Macfarlane Burnet wondered what would happen to such a diagnostic laboratory in two years' time, when all children were immunized against poliomyelitis. However, the establishment of that technique was an advance. He was most interested in the changing incidence of the types of poliomyelitis infection, and thought there was much work to be done along those lines.

Dr. Colebatch asked how long the cultural findings remained positive in poliomyelitis.

Dr. Ferris, in reply, said that there was no exact information, as infectivity varied. An effort was made to obtain a stool specimen within ten days of the onset. A culture could be obtained later, but it was uncertain.

DR. V. COLLINS asked whether there was any instance of a patient who had had clinical attacks of all three types. He had seen two attacks in one patient in the 1937 epidemic.

Dr. Ferris, in reply, said that he did not know of any proven triple infection. One patient had Type I infection and antibodies to Type II, and adults were found with antibodies to all three types.

Tracheotomy in Poliomyelitis.

DR. J. A. FORBES read a paper entitled "Tracheotomy in Poliomyelitis" (see page 66).

DR. H. MCLORINAN, in opening the discussion, said that he thought the question of tracheotomy was a vital one in all cases of respiratory and pharyngeal paralysis. A practitioner who examined a patient with "pooling" had every right to perform tracheotomy if he could make it safe to get the patient to hospital. That might easily happen in the country, and it might save life. Dr. McLorinan said that there were not many children who had to be nursed in respirators now, but they still got pharyngeal paralysis and many responded well to tracheotomy. Dr. McLorinan thought that the use of the tank respirator with tracheotomy was very good, and American workers still maintained that that was the best method. He asked whether Dr. Forbes knew how many days after the onset of paralysis death occurred.

Dr. Forbes replied that in the recent epidemic they had had 32 patients in respirators with 11 deaths. Four patients had died within twenty-four hours of admission to hospital. He could not give further figures.

Honours.

THE following Australian medical practitioners have been included by Her Majesty the Queen in the New Year Honours List.

Dr. Archibald John Collins has been created a Knight Bachelor.

Dr. William Edward Lodewyk Hamilton Crowther has been created a Commander of the Most Excellent Order of the British Empire.

Dr. Moya Kathleen Blackall has been created a Member of the Most Excellent Order of the British Empire.

Medical Appointments.

Dr. Anna Manheim has been appointed to the staff of State Hospitals and Homes in the Department of Public Health of New South Wales.

Deaths.

THE following deaths have been announced:

CROOKS.—Arthur Augustus Crooks, on December 12, 1954, at Elmore, Victoria.

GAULT.—Edward Leslie Gault, on December 18, 1954, at Warrandyte, Victoria.

CLARK.—Charles Clark, on December 19, 1954, at Newcastle, New South Wales.

BONDY.—Gustav Bondy, on December 20, 1954, at Sydney.

SMITH-GUTHRIDGE.—John Smith-Guthridge, on January 1, 1955, at Manly, New South Wales.

ARDILL-BRICE.—Katie Ardill-Brice, on January 3, 1955, at Sydney.

Diary for the Month.

JAN. 17.—Victorian Branch, B.M.A.: Finance Subcommittee.
JAN. 18.—New South Wales Branch, B.M.A.: Medical Politics Committee.
JAN. 20.—Victorian Branch, B.M.A.: Executive of Branch Council.
JAN. 26.—Victorian Branch, B.M.A.: Branch Council.
JAN. 28.—Queensland Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all contract practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Tasmania: Part-time specialist appointments for the north-west coast of Tasmania.

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